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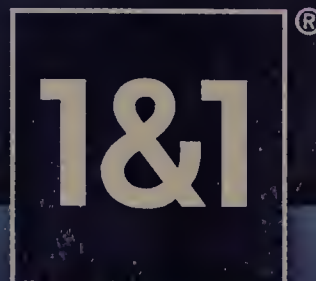
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FROM THE EDITOR | JOHN DIX

Good news on budgets, career development

Our Network World State of the Network Study gives a fascinating view into where you stand on everything from budget availability to thoughts on the stature of networking and plans for a range of technology options.

Regarding the latter, we looked at everything from data center consolidation efforts to adoption of ITIL/COBIT. Of the options considered, organizations are furthest along with efforts to virtualize and consolidate servers, and show the least interest in progress toward migrating to IPv6.

We'll do a deep dive on the tech plans of your peers in a coming issue, but since this research is hot off the press I wanted to share some of the bigger picture findings, starting with a glimpse into budget trends.

When the survey was conducted in July the economy was warming up a bit and we asked if that was translating into good news for IT budgets. Almost a third of the respondents (31%) said yes, they had been given additional funds for specific projects, while 40% said their budget hadn't changed. While that is encouraging, another large chunk (29%) said they have had to cut budgets mid-course.

Asked what the extended budget forecast looked like (the next 12 months compared to the last 12), 29% said they expected their budgets to increase, 37% said it would stay the same, and 16% said they were expecting cuts. The balance (18%) said they weren't sure which way it would swing.

Taken together, this is seemingly positive news. But Shvetank Shah, executive director of the Corporate Executive Board's IT Practice, points out the next two to three years are likely to be a grind, with company sales, stock price and capital availability all in flux, which will translate into uncertainty. We're not out of the woods yet.

But one good sign: emerging tech developments are elevating the importance of the network. Key findings:

- Asked if the network must become more intelligent and dynamic to support and capitalize on virtualization, 79% of the respondents strongly agreed or agreed.
- Asked if the adoption of alternative IT models (such as cloud computing) is making the strategic value of the network function more critical, 81% strongly agreed or agreed.
- Asked if the role of the network professional has shifted as the network has become/is becoming the enterprise service platform enabling dynamic/agile IT, 68% strongly agreed or agreed.

Network professionals are in a nice position giving the way the industry is headed. Now if we can only stabilize the budget and get to work.



John A. Dix
jdix@nww.com
Twitter.com/JDNWW

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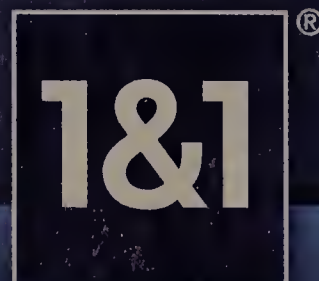
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Open source: the good and the bad

➔ **WHAT MICROSOFT IS** trying to do here is avoid further customers from leaving them. (Re: Microsoft: We love open source; tinyurl.com/248q8wm) They don't want to be seen as a bully against open source and Linux, even though they have many years and a long track record of doing so. They do this all of the time, by coming out and making public statements that try to soothe the attitudes of the customers, then behind closed doors they continue to try and undermine the competition and Linux and open source. I dumped Microsoft products years ago, and I'll never look back.

apexwm

➔ **SO WHY IS** everyone so in love with Apple, and they are far more closed than Microsoft? And why does Google guard their search algorithm like a state secret? Or Coca-Cola their formula?

If everything were open source, it would create chaos. Currently, it creates competition and forces large software companies to innovate. So that is good. And how about all the companies using open source code and developing products on top, and profiting from them, such as Sugar-

CRM. Sure, free for individual users, but beaucoup bucks for enterprises. So you have cold-hearted business people benefiting from the open source community. It gets kind of tiring to see Microsoft being vilified for everything. Without Microsoft creating a common standard, the PC industry would be in complete disarray today, and software vendors would have to support way too many platforms. Sure, Microsoft profited hugely in the process. But there were also good outcomes for end users and corporations.

Anon

VMware not a virtual monopoly

➔ **UMMM...CITRIX IS VMWARE'S** No. 1 competitor — not Microsoft. (Re: Microsoft, Citrix no longer sponsoring VMworld after dustup with VMware; tinyurl.com/16yn4k)

And there's no doubt that when it comes to server virtualization, VMware is the most dominant player — not Citrix or Microsoft. Citrix is the one challenging VMware — and VMware has specifically added language to the VMWorld contract that specifically limits/prohibits their competitors ability to showcase their solutions. You say boo hoo for Microsoft and Citrix — what you're not realizing is that VMware just told the world that Citrix and Microsoft's solution actually is better than VMware's decade old "binary translation" platform. If that wasn't the case, VMware wouldn't have outlawed everything that isn't "complimentary" to VMware products from the show.

Anon

➔ **EVEN THOUGH I** will not be seeing some important products from these vendors at VMWorld, I still have a smirk on my face. Microsoft has many excellent products and a wonderful portfolio, partially explaining its market dominance and penetration. It also has a public record of strong-arm partnerships. You either play their game, by their rules, on their turf, or you don't get to play. I value our partnerships with both companies and don't want to see another vendor war,

but let's be honest; all of us like to see the bully get his butt kicked once in a while! Karma baby, it's all about karma.

Timbo

Cisco falls short in L4-L7 market

➔ **FOR MANY YEARS** Cisco has always lacked features in the L4-L7 market compared to F5, Alteon and Radware. (Re: Ethernet switch leader Cisco challenged in Layer 4-7; tinyurl.com/29yl6sb) They have not put enough effort into this business unit as compared to their core routing and switching. The only reason Cisco has any market share in L4-L7 is the "no one got fired for buying Cisco" crowd or when Cisco bundles a "free" ACE blade with a core network upgrade. In true, unbiased bakeoff scenarios Cisco will always lose out on features and functionality.

Anon

If everything were open source, it would create chaos.

492 Old Connecticut Path, Framingham, MA 01701-9002

Main Phone: (508) 766-5301

E-mail: firstname.lastname@nww.com

Editorial Calendar: <http://tinyurl.com/39sf649>

EDITORIAL

Editor in Chief: John Dix

Online Executive Editor, News: Bob Brown

Executive Online Editor: Jeff Caruso

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Copy Chief: Tammy O'Keefe

DESIGN

Executive Art Director: Mary Lester

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Editorial Operations Manager: Cheryl Crivello

Office Manager, Editorial: Pat Josefek

SUBSCRIPTIONS

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Nokia names Microsoft's Elop as new CEO

NOKIA HAS NAMED Stephen Elop, former president of Microsoft's business software group, to become its new CEO. Elop will replace Olli-Pekka Kallasvuo in the top job on Sept. 21. The reshuffle comes as the world's largest cell-phone maker battles to compete with companies such as Apple and Research in Motion. While the company continues to enjoy good sales of low-end phones, analysts have faulted Nokia's smartphone line-up as weak compared to the competition. "Nokia has traditionally been strong in hardware, but has been found wanting in software," said Ben Wood, director of research at CCS Insight. Elop could be the man to change that, according to Wood: "Kallasvuo is a very bright guy, but he has a law degree. Now the guy who will head up the business has a computer science degree. He will bring software expertise to the business." tinyurl.com/37jfotd



camera, warning drivers up to 2.7 seconds prior to a possible accident. The C2-270 device, which mounts on the inside of a vehicle's windshield, takes photos 15 times per second and analyzes them to determine by shape what the object in the road is, whether it's a pedestrian, cyclist or motorbike. "The C2-270 will then issue audio and visual warnings, giving drivers enough time to avert a collision," said a spokesman. The latest model also can warn if a driver strays from a lane or follows another vehicle too closely. tinyurl.com/2uf85rn

Dell to make a play for Brocade?

AFTER LOSING out to HP in its bid for storage vendor 3Par, Dell may make a play for Brocade, analysts speculate. In fact, investment firm Oppenheimer & Co. believes Dell might become the most aggressive vendor in storage M&A. "We expect Dell, which we view as weak overall within the enterprise, to continue to aggressively expand its storage presence and perhaps even venture into networking," says Oppenheimer analyst Ittai Kidron. "HP is more well rounded, but could also add a few pieces to the puzzle. We believe IBM, EMC and NetApp could be active but are likely to be less aggressive given their position and relative portfolio

completeness." Oppenheimer sees the most likely M&A moves as Dell acquiring Brocade, Compellent or CommVault, and EMC acquiring Isilon. tinyurl.com/365osnl

Verizon's phone rings off the hook

INTEREST IN IPv6 is exploding, says Verizon Business, whose largest corporate customers are flooding the carrier with questions. CIOs are asking about how to maintain end-to-end connectivity across the Internet as some users upgrade to IPv6 and others remain on IPv4. They're also concerned about the latest mobile devices which must support IPv6. And they're asking how to ensure that their primary applications—whether commercial or homegrown—will support IPv6 traffic. "[Enterprises] need to have a migration path ready so when their CEO or C-level executive wants to use the latest and greatest cell phone, they will still get connectivity

Cisco, Citrix team on desktop virtualization

LIKE THE sound of turn-key desktop virtualization? Citrix and Cisco are jointly offering a package for running a large number of virtual desktops across an organization. The as-yet-unnamed offering includes Citrix's XenDesktop, which is VDI software that downloads an operating system to a desktop computer from a centralized pool of servers. The package also includes Cisco's Unified Computing System, an integrated assemblage of blade servers, switches, storage adapters and networking fabric. The package benefits from engineering customization,

which should cut the costs of deployment, the vendors claim. tinyurl.com/33wa2p3

Digital eyes on the road

MOBILEYE PRODUCTS added a pedestrian alert feature to its \$900 collision detection

IT VIDEO

Lets get D-I-G-I-T-A-L

Cisco Subnet blogger Kevin Wallace presents a three-part series of CVOICE videos that show how to configure digital voice ports. tinyurl.com/34vzndz



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GOOD BAD UGLY

good

Finally, CEO compensation doesn't go overboard

OK, IT'S all relative. Oracle CEO Larry Ellison received compensation in fiscal 2010 valued at \$70.1 million, compared to \$84.5 million in 2009, according to documents filed with the SEC. And actually, Oracle grew revenue and profits by 15% and 10%, respectively, in its 2010 fiscal year, which ended May 31, so a pay raise for Ellison wouldn't have raised many eyebrows, as have pay raises for CEOs whose companies' fortunes have plummeted in recent years.

bad

No really, it's my fault

JUST UNDER two-thirds of all Internet users have been hit by some sort of cybercrime, and while most of them are angry about it, a surprisingly large percentage feel guilt too, according to a survey commissioned by Symantec. "[Fifty-four percent] said they should have been more careful, when they responded to online scams," said Norton Internet Safety Advocate Marian Merritt.

Wi-Fi data collection goes on

FOUR MONTHS ago, amid a backlash from government regulators and privacy advocates, Google stopped collecting Wi-Fi data with its Street View cars. But that doesn't mean Google has stopped collecting wireless data altogether.

Instead of sending out cars to sniff out wireless networks, Google is now crowdsourcing the operation, with users of its Android phones and location-aware mobile applications doing the reconnaissance work for it. In the past few months, Apple has also quietly started building a similar database, leveraging its large base of users to log basic Wi-Fi data. There are others: A Boston company, Skyhook Wireless, has been logging wireless access points for years, as has its competitor, Navizon of Miami Beach. As it becomes increasingly important for programs that run on your phone to know exactly where you are, having a way of figuring out exactly where you are becomes critical.

ugly



to all of their applications," says William Schmidlapp, senior consultant for Verizon Business. tinyurl.com/2u7xfxo

R&D relief

PRESIDENT OBAMA has called on Congress to approve a permanent R&D tax credit for U.S. companies as part of a multibillion-dollar package



intended to jump-start the economy. Obama's proposal would expand the tax credit from about \$7 billion to \$10

billion a year over the next decade. Tech groups have long pushed for a permanent R&D tax credit (the existing R&D tax credit has lapsed 13 times since 1981), but lawmakers have been reluctant to extend the credit because of its cost. Every dollar spent on the tax credit generates two dollars of economic activity in the United States, says Rey Ramsey, president and CEO of TechNet, a lobbying group representing tech CEOs. tinyurl.com/36vhc54

IBM code unfetters virtual workloads

SOME OF the first fruits of an IBM-led research project called Reservoir are making their way into the field of cloud computing, in the form of a virtual machine migration technology. While VMware offers the ability to move a virtual machine from one server to another by way of its VMotion software, this approach has its limits: It requires both the source and the destination hosts to share the same storage device, which limits the range of migration. In contrast, the Reservoir technology involves copying the workload over to the new location — while

TRUE FACT

58%

Percentage of respondents surveyed at the VMworld conference that have virtualized 50% or more of their physical servers. In 2009 only 39% had.

SOURCE: VIRTUAL INSTRUMENTS

keeping it running — using a delicately choreographed combination of push and pull replication mechanisms. "The new open source code enables sharing across domains where shared networked storage and hardware components are not practical," said Yaron Wolfsthal, an IBM research senior manager. tinyurl.com/35hxy8

Get your thinking caps on

IF YOU'VE always thought you could solve government problems better than elected officials, now's your chance. Challenge.gov, announced by U.S. government CTO Aneesh Chopra and CIO Vivek Kundra, is seeking the public's ideas on several problems agencies want solved — and it's offering rewards for the best ideas. The U.S. Department of Energy is offering \$15 million in prizes in a contest to create ultra-efficient lighting products, for instance. Nine other contests offer prizes of \$1 million or more. tinyurl.com/39dwdeq

[TOUGH QUESTION #5]

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802.11n reshaping Wi-Fi experience

BY JOHN COX

SHIPMENTS OF 802.11n access points have accelerated since the IEEE standard was formally approved one year ago. But what the numbers alone don't show is the new reality of Wi-Fi networks: they are fast becoming the preferred way to connect and stay connected in the enterprise.

And that reality is sparking new demand from enterprise customers, and new innovation from wireless LAN vendors, to make Wi-Fi networks "work" like wired Ethernet – reliably, consistently, securely – for all kinds of traffic, including video.

"Enterprise wireless LAN vendors are continuing to work on spectrum management and other features for 2011 to create a self-adapting, self-healing wireless LAN," says Paul DeBeasi, vice president, research director, with Gartner's network and telecom strategies group. "The idea is a wireless network that will function like a wired network in terms of performance and reliability."

Ground zero for the 11n revolution is the college campus, with hospitals not far behind. Colleges and universities have a growing population of the unplugged: students who've never used an Ethernet cable. They have the expectation that whatever device they have will be able to connect wirelessly, and handle games, YouTube videos and "American Idol", all in addition to classroom applications.

What's more, says Jeffrey Sessler, director, information technology at Scripps College, Claremont, Calif., is that each student often now has "multiple Wi-Fi-enabled devices needing regular access." One student can have a game console, smartphone or Skype phone, laptop or tablet (or even both), printer, and Internet radio/alarm clock.

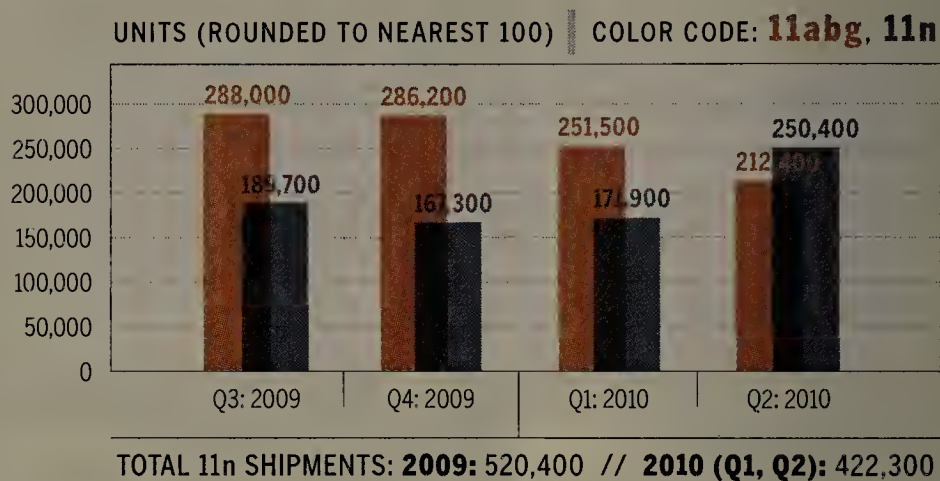
These changes are driving Sessler and other IT managers to design enterprise WLANs as mission-critical, production networks that are optimized for capacity and performance.

According to IDC, the most recent WLAN quarterly revenues and shipments show the market dynamics even in the face of a global and U.S. recession (see chart).

Over the last four quarters, through June 2010, shipments of enterprise-class 11abg access points in North America have fallen to 212,500 units from 288,000. During that same period, 11n shipments, hampered by the economy initially dropped from 190,000 in the third quarter of 2009 to a low of 167,300 in the fourth quarter, before rising in the second quarter of 2010 to 250,400. The fourth quarter

802.11n growing up

Adoption of 802.11n in the enterprise market is soaring in 2010. Even with the weak economy in late 2009 and early 2010, 11abg access points fell off, showing 11n is rapidly replacing the older Wi-Fi technology.



SOURCE: IDC

marked the first quarter where 11n shipments topped 11abg, and by nearly 40,000 units.

"It's penetrating very fast, and eroding 11g [sales] faster than expected," says Edgar Figueroa, CEO of the Wi-Fi Alliance (WFA), an industry group that certifies product interoperability under the "Wi-Fi" brand. The penetration is sped by the uptake of 11n in a wide range of consumer devices, including consumer electronics such as digital cameras and flat-panel TVs. The WFA has certified 1,696 devices for 11n, including 80 handsets.

According to IDC, the top five enterprise 11n vendors by shipments and revenues so far in 2010 are in order Cisco, Aruba, Meru, Motorola, and HP.

Many of those 11n access points are getting plugged in on colleges and universities. And it's here that the network transformation is most visible.

The campus 11n upgrade often coincides with a kind of mental upgrade in IT thinking: more IT departments now expect, and encourage, students to treat 11n Wi-Fi as their primary network connection.

Use of wired ports has plummeted on campuses, after more than a decade of costly wiring to bring a port to every pillow. Carnegie Mellon University, in Pittsburgh, this year has deactivated wired ports in all dorm rooms. Students can get a wired port just by requesting activation, but the change in policy is striking: the wireless edge is now reality.

In building rehab projects and in new

buildings, fewer wired ports and switches are being deployed, yielding capital, licensing, maintenance and operational savings. "The question is how to realize the benefits of our 11n investment, and appropriately size the wired network," says Dan McCarriar, director, Network and Production Services at Carnegie Mellon.

Brandeis University in Waltham, Mass., recently renovated four dorms, offering only 11n wireless connectivity for students. "We've seen an abandonment of the wired infrastructure" by users, says John Turner, Brandeis' director of networks and systems. The estimated cost for rewiring the four buildings was \$200,000. The final cost of the Aruba Networks WLAN deployment for the four buildings? Less than \$80,000.

The 11n upgrade is often accompanied by upgrading 100Mbps Ethernet to 1Gbps to backhaul Wi-Fi traffic to the core network, often with Power-over-Ethernet (PoE) to simplify access point installment.

The University of Washington in Seattle is upgrading its Aruba 11abg network to 11n, planning to make use of the 5GHz band, with more channels and less crowded spectrum. "We upgrade the wired infrastructure with Gigabit Ethernet switches where practical, though we expect that users will see a performance boost [even] on the older 100Mbps switches," says David Morton, director of mobile communications strategies.

► See 802.11n, page 17



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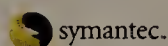
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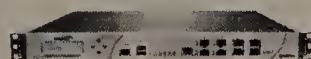
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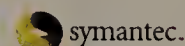


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Regulations can blindside VoIP users

Often VoIP isn't cited directly but falls under scrutiny of compliance auditors

BY TIM GREENE

AS ATTACKS against VoIP persist businesses not only have to defend themselves, they have to do it under the gun of regulators who want proof that security was addressed in accordance with their ever-changing rules.

VoIP denial of service, toll fraud and eavesdropping attacks are serious problems, yet many businesses lack some of the most basic VoIP protections such as encryption, experts say. There is a sense of urgency to deal with these issues because at the same time, businesses are forced to comply with regulations such as the Sarbanes-Oxley Act, the Health Insurance Portability and Accountability Act (HIPAA) and Payment Card Industry (PCI) standards that present a moving target as they are revised and updated.

"Recent events involving financial fraud, product safety recalls, and disasters in environmental health and safety have escalated

this issue even more in the past two years," according to a Forrester Research study, "The Regulatory Intelligence Battlefield Heats Up", "and the appetite among legislators in the U.S. and abroad seems decidedly in favor of tighter regulatory control."

For the most part, regulations try to protect personally identifiable information that can lead to identity theft, fraudulent use of credit cards, pilfered bank accounts and toll fraud against corporate phone systems.

VoIP is rarely addressed directly in these regulations, but the rules nevertheless apply in some cases. For example, PCI standards say, "Use strong cryptography and security such as SSL/TLS or IPSEC to safeguard sensitive cardholder data during transmission over open, public networks."

That calls for encrypting VoIP calls that cross the open Internet in which credit card numbers are being recited, says Michelle Klinger, a PCI qualified security assessor from Dallas. "I would be inclined to validate

that the calls are being encrypted," she says, although VoIP on internal networks would not need that protection. Businesses need to look out for language in regulations that sound like it refers to VoIP.

For instance, HIPAA says businesses must take steps to secure electronic protected health information, which might not seem to affect VoIP calls, but relates directly to recorded calls and digitally stored voice mail, part of any VoIP system. Similarly, if interactive voice response is used to navigate to protected information, its use should be monitored and documented.

On the other hand, the Federal Deposit Insurance Corporation (FDIC) has published specific VoIP guidelines to protect customer data traveling in IP voice networks in accordance with Graham-Leach-Bliley regulations.

"The risks associated with VoIP should be evaluated as part of a financial institution's

► See **VoIP**, page 20

When did complexity become the norm?

(The day IP telephony vendors saw how it locked you in.)



Smartphone support challenges enterprise IT

BY ELLEN MESSMER

SMARTPHONES ARE among employees' favorite playthings, but keeping workplace toys such as the iPhone in good order is a real job in the enterprise, and those who do it say it's tough to find suitable security and management software.

"We've been getting a lot of requests over the past year, [from people] such as the top-level manager and vice presidents that go out and buy an iPhone and say, 'make it work,'" says Alex Yanez, telecommunications engineer at clothing retailer Patagonia. About 150 people at Patagonia now use smartphones of varying makes, and most of the wireless accounts (typically Verizon Wireless and AT&T) are paid for by the corporation.

Yanez has primary responsibility for Patagonia's smartphone support, and he says there are some challenges. "I've become the repair guy for broken iPhones," he notes, adding that the company has decided not to

support "jailbroken" iPhones with disabled controls, since this represents additional risk.

But Yanez says the main concern is establishing management controls over smartphones, especially since it's now accepted that smartphones used by corporate employees will be subject to Payment Card Industry (PCI) compliance reviews. Patagonia has been using Good Technology's mobile-device management software to exert some controls, such as remote wiping. But Yanez says he needs more in the area of inventory management and billing and is taking a look at Visage Mobile for that.

Supporting Android is especially problematic because there's not much management and security software out in the market yet, he notes.

"The biggest issue is what people are downloading," Yanez says. At this point, he says it's difficult to exert the level of granular controls that would be preferred on smartphones.



Architecture firm Perkins+Will is also working to bring order to the smartphones that employees want.

"The demand forced us to accept them," says Sherri Houmadi, mobile device manager at Perkins+Will. The firm supports the iPhone and Android smartphones, along with the Palm Treo and BlackBerries of older vintage. The firm is also hearing demands for jailbroken iPhones in which Apple's native controls have been disabled, but hasn't made a decision on that.

Architects work long hours and are often on the go, so supporting the smartphones they want is not an unusual request, Houmadi says. The company would prefer that employees use smartphones owned and issued by the company, but the employee can make the

► See **Smartphones**, page 20

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Getting close to an end of the Internet

IT IS now a bit more than 18 years since Frank Kastenholz first noticed that assignments of one class of IP addresses would soon outrun supply. This observation led the press to

think that the Internet was running out of all IP addresses (it was not) and to the IETF initiating a process to develop a "next generation" Internet protocol that would have vastly more addresses so that it would, in theory, never run out.

A lot of things have changed in the Internet since 1992 but, finally, we are approaching the time when there will be no new IP addresses to assign to new Internet users. At least there will be no more of the kind of addresses the Internet has been using for most of its existence.

Kastenholz's observation led the IETF to develop IP version 6 (IPv6). It also led the IETF to recommend changing the way IP addresses were assigned to be more conservative of address space. Kastenholz, along with other researchers, predicted in 1994 that we would run out of IP version 4 addresses in 2008 plus or minus three years. That prediction turns out to be quite good — the current prediction is that the repository of IPv4 addresses will run out next June (right at 2008+3) and the regional IP address registries will run out less than a year later.

The lack of IPv4 addresses to assign does not mean that the Internet will stop working or growing. Organizations that have unused IPv4 addresses will be able to transfer them to organizations that need addresses. But IPv4 addresses will become harder, and more expensive, to get. The better long-term solution is to migrate to IPv6.

Major operating systems and equipment vendors already support IPv6 but there are not all that many IPv6-enabled Internet sites or

service providers in the United States. That is slowly changing. Google, Facebook and other big service providers are bringing up IPv6 sites and some of the large ISPs can transport IPv6. My own site is not yet on IPv6 although my Mac-based systems have supported IPv6 for years. My ISP (Comcast) only recently started IPv6 trials. I expect to be IPv6-connected as soon as Comcast rolls out the service.

If you work for a company that has an Internet presence you should be thinking about bringing up your Web sites on IPv6, as well as IPv4, so that future IPv6-only customers can access your services.

We are running out of IPv4 addresses because the Internet is a success. There are now more than 1.9 billion Internet users in the world. They use more than 760 million computers and they access over 200 million Web sites. It is no wonder that few of the 4 billion IPv4 addresses are left for assignment. IPv6 increases the number of addresses by a factor of 4 billion so this transition process will not be needed again for a very long time.

The Internet will support IPv4 addresses for a long time, so if you do not IPv6-enable your environment it will keep working. But over time a smaller percentage of the Internet will be able to reach your services.

Disclaimer: As a board member of ARIN (the regional Internet registry for America, Canada and some of the Caribbean), I watch the run-out process with much interest and, as co-director of the IETF's IPv6 project, I watch the IPv6 adoption process with at least as much interest. But Harvard has not stated any university opinions on the topics, so the above discussion is my own. ■

Bradner is Harvard University's technology security officer. He can be reached at sob@sobco.com.

When did complexity become the norm?

(The day IP telephony vendors saw they could profit from it.)



TREND ANALYSIS

► 802.11n, from page 12

At Scripps College, 60% of the Wi-Fi clients are using the all-Cisco 11n network: 17% on 5GHz, 43% on 2.4GHz, according to IT Director Jeffrey Sessler. Actual throughput for a given end user depends on a host of variables, including the 11n client radio, number of clients linked to a given access point and the various applications in use. But Sessler says an Apple iMac, right out of the box, can sustain 130M to 140Mbps when close to an access point that uses the 5GHz band and is configured for the wider 40MHz channels.

At Scripps, as with many other 11n deployments, the network design is focused on capacity, not coverage. "We try to shoot for no more than 12 to 15 clients per access point," Sessler says. "With dual radios [one on 2.4GHz, the other on 5GHz], this ensures that most access points are lightly loaded and able to meet the most demanding of clients."

While increased throughput is one benefit of 11n, there are others, equally important. One big difference from 11abg is "improved client reliability, especially in the fringe or RF-challenged areas," Sessler says.

Ethernet-like Wi-Fi?

Achieving Ethernet-like Wi-Fi with 11n

requires planning and investment. "To get the full benefit of 11n, it has to be optimized as part of a well-designed WLAN architecture," says Andrew Borg, a senior research analyst at Aberdeen Group.

That can be a challenge today. "We are looking for improved tools and management systems," says UW's David Morton. "The current tools, at least how we utilize them, provide some basic information. But I'd love to see better ways to proactively and automatically spot and deal with trouble."

Vendors are focusing attention on making Wi-Fi more deterministic, more resilient and more managed. Earlier this year, Aruba, Cisco and Ruckus Wireless all announced software changes, via beam forming, to better support multi-cast video over 11n. The results can be dramatic, as this review (tinyurl.com/yhslwnh) by Craig Mathias of the Ruckus 7300 series access points shows.

Transmit beam forming is just one of the optional features in the 802.11n standard that vendors are now racing to deploy. Together, they can dramatically improve the Wi-Fi experience. One example is a technique called space-time block coding, which exploits 11n's multiple antennas more for improved signal reliability than for higher data rates. Users

will see more consistent data rates, without fading or dropping.

Pending amendments to the 11n standard will add key new features also: 802.11v will add an array of counters for statistics gathering, add power management to improve battery life and improve support for location data. The 11k radio resource management standard packs more intelligence into the client radio, to cooperate with the access points to improve signal quality.

The Wi-Fi vendors had already been implementing a slew of proprietary features to address this challenge. They all involve extending control and intelligence to the Wi-Fi client, and coordinating its requirements, behavior and activities with the Wi-Fi access point infrastructure.

The Wi-Fi Alliance's Wi-Fi Multimedia Admission Control spec, now in development, will let wireless networks negotiate and manage streaming media sessions, so a request for a high-definition video doesn't choke off Wi-Fi voice users on the same access point.

Such innovations, spurred by the 11n ratification, are moving us toward a wireless environment that's not just "everywhere" but everywhere reliable, consistent and adaptable. ■

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iPhone 4 Wi-Fi proves a challenge for university

BY JOHN COX

THE IPHONE 4 is the first to support 802.11n, which offers the highest Wi-Fi data rates and throughput. But it runs only on the crowded 2.4GHz band, and at one university, which is deploying hundreds of the new devices, that poses some big Wi-Fi challenges for IT.

The iPhone deployment at Abilene Christian University, in Abilene, Texas, is unusual and possibly unique: there can be as many as 500 or more iPhone 4 handsets in a big lecture hall, all trying to connect to the hall's collection of wireless access points. It's especially frustrating because ACU's IT group had successfully deployed hundreds of 11g iPhones in the same lecture hall, on the same 2.4GHz band, with minimal problems.

For now, in the areas with 802.11n access points, 11n has in effect been turned off, and the new iPhone 4s will run as 11g clients, at least for a few weeks until the kinks get worked out. The wireless LAN setup based on ACU's 11g experience includes the unique idea of using the student's as radio frequency signal attenuators.

At this point, it's not clear if the WLAN instability is an issue of: configuring the access points; the mix of 11g and 11n clients, which triggers 802.11 protection mechanisms adding overhead; the limited channel assignments; a possible iPhone 4 Wi-Fi bug; or some combination of these.

Three years ago, as part of a major mobile learning initiative, ACU decided to equip each successive incoming freshmen class with the current iPhone model, as part of systematic, campus-wide exploration of "mobile learning" course content and teaching methods. The project included a campus-wide 802.11abg WLAN, both 2.4GHz and 5GHz, based on Alcatel-Lucent products (which are from Aruba Networks). They persuaded AT&T to put a 3G cell site on campus.

When the iPhone 4 was announced, ACU decided to begin upgrading to 11n starting with dorms, the library and some lecture halls. The IT group assumed the new phones would support the 5GHz band, which is much less crowded and supports 11 vs. three non-overlapping channels. The extra channels mean more channel assignment options, making deployment and management simpler, and give the option for merging two standard 20 MHz channels into one "fatter" 40MHz channel, to boost throughput, with plenty of channel options remaining.

When they discovered the iPhone 4 only runs on the 2.4 band, "it was kind of deflating,"

says Arthur Brant, ACU's director, networking services. That meant the iPhone 4 would join its 3G and 3GS brethren on the same crowded frequency, contending for the same three channels. Of 1,000 incoming students, 800 chose iPhone 4 (roughly 300 faculty also have it), the remainder chose the existing 11g-only iPod touch (Apple's just-announced new iPod touch has 11n).

The new phone's Wi-Fi chip is Broadcom's BCM4329, a low-power, single-chip system designed specifically for mobile devices. It can run in either Wi-Fi band.

It appears to be what's called a single-stream MIMO (multiple input multiple output) implementation, which sounds like a contradiction in terms. (Through a spokesperson, Broadcom declined to explain its products features or the implementation options for device makers like Apple. Apple also declined to comment on its 11n implementation.)



“When we discovered the iPhone 4 only runs on the 2.4 band, ‘it was kind of deflating’.”

ARTHUR BRANT, ABILENE CHRISTIAN UNIVERSITY'S DIRECTOR OF NETWORK SERVICES

Basically, MIMO breaks up a data stream into two or more substreams, each which is usually but not necessarily associated with a corresponding antenna. These inputs and outputs have a multiplicative impact on data rates and throughput, and the same technology is part of mobile WiMAX and LTE.

Single-stream 11n can't achieve the same effect, but it does realize higher throughput, greater range, and more robust signals compared to 11a and 11g due to other optional features of the 11n specification, including space time block coding, which improves transmission redundancy and reliability. The Broadcom chip supports many of these options.

What does this all mean for ACU's deployment? It means that in the most stressed areas — a big lecture hall packed with 500 freshmen armed with iPhone 4 handsets, 11n has been deactivated.

The campus has two big lecture halls, with stadium seating, one of 6,400 square feet seating 300 students, the other of 7,800 square feet seating 800.

In the smaller of the two halls, ACU previously had refined its 2.4GHz strategy for iPhone on 11g: packing in access points mounted on the side walls, but just 3 feet off the ground; using four channels (including one not considered "non-overlapping"); and

actually increasing the number of connections allowed per access to 50 from 30; running the radios at 60% of full power. Wireless clients such as laptops, which could run on the 5GHz band, were configured to automatically choose that option.

The low position of the access points means the radio signal has to pass through numerous bodies, deliberately weakening it in an attempt to encourage the iPhone to find and hold onto a very nearby access point. That let the four-channel arrangement work adequately.

Initially, ACU used the same approach for 11n in the larger hall: 16 11n access points total, 10 around the side walls, six in the center (two each at front, middle and rear); mounted 2 feet instead of 3 above the floor; four channels; 50 connections per access point; radio power settings to be determined.

In late August, before freshmen arrived, ACU's Brant staged what he calls a BreakIT

session, inviting staff, faculty and some students to the lecture hall for a Wi-Fi stress test. About 160 folks turned up, with a mix of iOS devices, as well as laptop PCs. The access points have two radios, and the plan was to have one radio for 11g and one for 11n clients. They were asked to enter a specific URL on their Web browsers. The effect was dramatic.

"Almost immediately, we started experiencing [network] instability," Brant says. In short order the BreakIT session indeed broke the WLAN. Reviewing the logs, the IT team found that every access point but one rebooted, some of them several times.

One likely issue is the mix of high numbers of 11n and 11g clients on a relatively small number of nearby two-radio access points. That situation triggers two problems. One is the increased difficulty in assigning one of the three available non-overlapping channels to each radio, coupled with the fact that the 11g clients hang on to the channel for longer time periods per frame transmission.

The other problem is that the 11g clients activate one of several 802.11n protection mechanisms, designed to allow a mix of 11g and 11n clients to associate to the same 11n access point.

Brant plans to keep sleuthing, tinkering and testing to find the optimal Wi-Fi configuration for dense iPhone 4 deployments. ■

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► **VoIP**, from page 14

periodic risk assessment," the advisory says, "with status reports submitted to the board of directors as mandated by section 501(b) of the Graham-Leach-Bliley Act (GLBA). Any identified weaknesses should be corrected during the normal course of business." That is accompanied by a list of recommended actions. (see chart, right).

The threats are real, says Jason Ostrom, the director of Viper Lab, the VoIP and unified communications vulnerability arm of Sipera Systems. A client suspected that someone was listening in on its VoIP calls, and to catch the eavesdroppers planted false information in conversations to see who would pick it up as fact. It turns out a third party with legitimate access to the corporate network but that was in litigation with Viper's client had tapped the VoIP network, he says.

The problem can be equally grave with video. The telepresence communications of a Fortune 500 CEO were being picked off by eavesdroppers, Ostrom says.

Some IT directors Ostrom has dealt with try to keep up with the regulations by educating themselves. That doesn't always prove to be enough, says Ross Leo, a senior consultant and trainer for Supremus Group, because some businesses overlook the phone system entirely as a possible vulnerability. "I've had clients who said they'd completely forgotten about it. They think it is just a phone system, but it's not; it's computers."

Chris McClean, an analyst for Forrester, says as regulations change and become more complex, businesses will have to address VoIP compliance more directly, either by investing in internal groups to keep on top of them or by hiring third parties to do it for them.

If by the nature of its work a business faces three or four sets of regulations each with quarterly compliance reports, the task quickly becomes overwhelming for many IT departments, McClean says. And regulators aren't the only ones adding to the burden. Business partners may have contractual demands about security that need verification.

Businesses that record VoIP calls need to store them with applicable regulations in mind as well as the demands of legal discovery should the stored conversations become relevant to court cases, McClean says. "How are you keeping track of these conversations? They may be discoverable if there is an investigation," he says.

Diligence in following cases of VoIP exploitation is essential, he says. When details of such attacks are publicized, businesses should examine their own defenses to determine whether they could have withstood the

Keeping VoIP compliant

While VoIP's often not mentioned directly, regulations within Sarbanes-Oxley, Payment Card Industry and Graham-Leach-Bliley, among others, can apply to the technology. Here are some general tips on how to keep VoIP compliant in the ever-changing regulatory environment designed to protect sensitive information.

- Implement physical access controls for VoIP gear.
- Use integrity controls and encryption in transmission of VoIP.
- Document the security and activity of voicemail systems.
- Document interactive voice response activity if IVR is a gateway to protected information.
- Patch associated servers and databases and perform regular vulnerability and virus scans.
- Harden servers by removing unnecessary services and tools from the VoIP system.
- Don't use softphones unless necessary as they are susceptible to additional threats via data channels.
- Use lawyers to craft call record-retention schemes that meet applicable regulations and statutes.

published assault. If not, they should remediate. "They should ask, 'How would we have responded? Could we have prevented a similar attack?'" McClean says.

Such opportunities are limited, Ostrom says. "The reality of the situation is businesses don't disclose. There's no incentive if they've suffered a breach," he says.

Businesses seeking how to deploy VoIP in compliance with regulations may benefit from services that are just now coming to light, McClean says, from such consultants as LexisNexis (a member firm of Reed Elsevier), SAI Global, Thomson Reuters and Wolters Kluwer. These consultants can stay on top of regulatory changes and sell that information to their business customers.

"The battle will come down to delivery

of premium content, which will still come through a mix of legal and consulting firms, specialty research providers and compliance product integration," he says in his report.

To be valuable, those firms will provide legal analysis of the implications of new rules, define the controls that businesses must use to meet the updated regulations and share what other similar businesses are doing in response to establish a new set of best practices, he says.

"In the next three years," he predicts, "detailed updates will be widely available through RSS feeds, and nearly all governance, risk management compliance and compliance management vendors will support regulatory updates mapped to risks and controls using XML tags." ■

► **Smartphones**, from page 15

decision to use his own. The IT department has also taken on responsibility for fixing broken smartphones.

One issue involves downloading firmware patches from the carriers. "It can be a pain. You have to notify the user if they don't already know, and a wireless upgrade can take hours," says Houmadi. Perkins+Will also uses Good Technology on the BlackBerry for remote wiping and other features, but Houmadi says she's still looking around to find suitable candidates for more comprehensive enterprise log-management actions. Overall, the new wave of smartphones can make you feel it's all being made up as everything goes along, she adds.

More smartphone management and security software is coming into view, but it's only just beginning to meet the more

exacting needs of enterprise customers.

"For the Android or iPhone, the application lockdown doesn't exist yet," acknowledges Ojas Rege, vice president of products at start-up MobileIron, which supports multi-operating system mobile-device management for iPhones, Android and Windows Mobile. He says the ability to set restrictive black lists or white lists remains something for vendors to tackle.

Patch management largely takes place outside the control of the IT department in comparison to traditional PC-based management, Rege says, noting the various smartphone operating systems are quite different. "There's this chaotic endpoint," acknowledges Rege, and it's impacting the IT department responsible for these devices. "They have so much anxiety, but they can't do anything about it. They'll think, 'I have all the accountability, but way less control.'" ■

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Downloading YouTube video

Let's start off with an amusing hack I've been meaning to mention since it appeared earlier this year: YouTube's TEXTp. This feature for videos was announced on The Official YouTube Blog on March 31 (a pretty big giveaway that it was intended as a joke).

What TEXTp does is transcode video so it is rendered in images of letters and numbers. The "rationale" was that by using images of characters TEXTp videos save bandwidth (quite obviously they don't). Check out the original version of the excellent (and slightly weird) music video, "Do The Cosmonauty" (tinyurl.com/3821g2) and the TEXTp version (tinyurl.com/2w688nv).

But what if you want to keep a copy of either version of this video or maybe just save the audio track? Maybe you want to you enjoy the content on your commute or other journey or use the video in a corporate training video. Whatever the purpose, you need to figure out how to download the content.

Over the last few months a number of tools have appeared to make this easy (although be advised that YouTube, for one, doesn't want you to do this). Keepvid is an example of a Web-based service that will help you copy video content from any site — including YouTube — to your PC for free.

At the top of the Keepvid home page is a button that you drag to your browser's links toolbar to create a "bookmarklet" (a JavaScript fragment in a browser bookmark). After that,

whenever you are on a page with video content you would like to download, you just click on the bookmarklet. The bookmarklet appends the URL of the page you're on with the Keepvid URL and opens a new tab or page in your default browser (you can also enter the target URL on the Keepvid home page rather than use the bookmarklet).

Keepvid displays a list of links to all of the video content on the target page and lists all the available formats it finds. You right click on a link, select "save link as ...", and BAM! You've got your copy. Very useful and very simple. Props, chaps.

If you'd rather use a more sophisticated desktop application that does a similar job, check out YouTube Music Downloader.

This Windows program is free until Sept. 15 (after which it will cost \$29.95) and is neither time limited or hobbled in any way.

YouTube Music Downloader (which I will henceforth call YTMD) will only download YouTube videos and can convert them to just audio (MP3) or save them as videos (AVI, WMV, MOV, MP4 and 3GP formats are supported).

► See Gearhead, page 24



Mark Gibbs' Gearhead

IT asked and answered

Ron Nutter tackles your tough tech questions at tinyurl.com/yg2o434

Why does Cisco restrict the number of spanning sessions? Is there any other solution available to have unlimited spanning sessions for both Tx/Rx? Also, is there any solution that does the spanning based on source or destination IP address?

➔ While I cannot tell you why Cisco limits the number of port spanning configurations, I can tell you why the limits exist. In addition to the switch handling its port/data switching duties, having it copy data on an existing port/VLAN to another port/VLAN adds overhead, meaning additional work for the switch CPU and memory being tied up. Depending on the amount of traffic on the ports involved, you can run into the following problems: 1) Traffic destined for one or more of the span ports may get dropped and/or 2) Traffic for one or more of the other ports not involved in the spanning configuration may experience traffic drops. One way you can see this is to setup your switch for syslog and it will start complaining and start to drop traffic. As to the second part of your question about only spanning traffic based on a particular IP address, within Cisco IOS you can span traffic based on specific VLANs and can also direct the traffic to be spanned to other VLANs. If you want the traffic to end up on another switch, you can use a remote VLAN option that will help accomplish that task. Spanning traffic based on IP address, ports used or something else requires deep packet inspection, and you will need an appliance such as NetOptic's Director.

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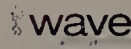
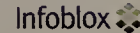
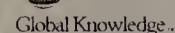
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GADGETS

Accessories to enhance the iPad

APPLE MAY THINK that its iPad is magical and revolutionary, but it's far from perfect, requiring additional accessories and products to enhance its features and functions. Here's a bunch of the latest iPad accessories that have come across my desk recently:

► Targus Stylus for Apple iPad (\$15):

The iPad's large screen is geared for your finger, of course, but eventually you get sick of cleaning off fingerprints. This stylus has a soft rubber tip that doesn't leave fingerprints, and should remind mobile users of the stylus from the early days of the Palm Pilot. If you don't have an iPad, the stylus can work with any touchscreen device out there. The biggest problem is figuring out where to store it when not in use — it's easy to lose this, just like a pen.

► **Otterbox Defender Series (\$90):** An issue you may face if you have children around is the possibility of them dropping the iPad, so protecting the device needs to be more than just a sleeve or other case. Enter Otterbox, which makes excellent rugged cases for devices. Its Defender Series case for the iPad offers a bunch of different protection options, including a soft rubber outer cover, and then a harder protective case that goes over that. The design still allows for the use of all the buttons on the iPad, such as volume, power and so forth. Parts of the case can also be separated and then used as a stand for the device, and the system comes with a third protection layer, a thin plastic screen protector that can be affixed to the iPad

The FlexStand (left) and Macally iPad Stand (right) can provide much-needed support.

screen. The package also includes a cloth wipe that can remove fingerprints. A good investment all around.

► M-EDGE FlexStand for iPad (\$30):

Speaking of stands, this handy gadget gives you a lightweight and flexible way to prop up the iPad in a portrait or landscape position if you are looking to share the screen with others, or if you just get tired of holding it in your hands or your lap. The six arms include four with flexible rubber feet that attach to the corners of the iPad, and the other two legs can be adjusted to create the back part of the stand. While it takes some practice to get the stand to stay up correctly, the light weight of the device makes it appealing for mobile workers.

► **Macally 2-in-1 Bluetooth Keyboard and Stand (\$100):** I have mixed feelings about this. I love combination gadgets, so the combination of a Bluetooth keyboard and iPad stand is a nice touch. The keyboard's dust cover becomes the stand for the iPad, and it's very sturdy — it can also be used with an iPhone. Powered by two (included!) AAA batteries, the keyboard's Bluetooth connection is very responsive as well — I didn't notice any lag when typing on it. The problem, though, is the size of the keys. The

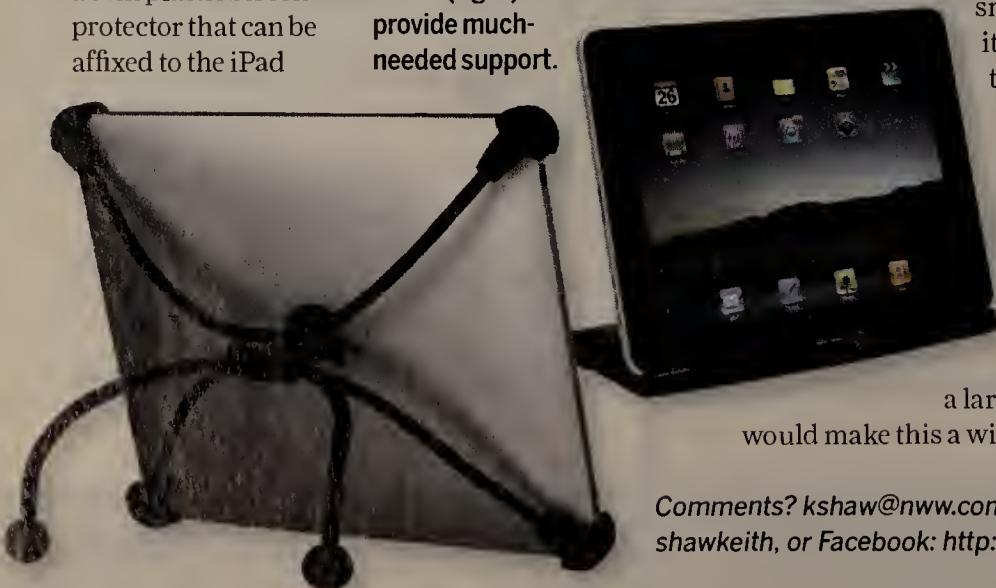
small keys make it very difficult to touch type, and regularly used keys, like the delete and shift keys, are even smaller than the letter keys.

At this price, a larger keyboard would make this a winner.

Comments? kshaw@nww.com, Twitter: @shawkeith, or Facebook: <http://bit.ly/cgVPsQ>



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TRUE FACT

12 thousand

Number of laptops lost in United States airports each week, of which 65% to 70% are never reclaimed.

SOURCE: DELL AND PONEMON INSTITUTE STUDY

► Gearhead, from page 22

YTMD monitors your clipboard so if you copy a YouTube URL and switch to the YTMD application it automatically offers to start a download. You can also drag and drop YouTube URLs onto YTMD's download list or enter a URL manually, and the program includes a built-in YouTube music video browsing window.

If you're using a video accelerator utility such as SpeedBit (which I discussed in my Network World Web Applications Alert newsletter [tinyurl.com/33ohov8]), you may see a curious phenomenon: YTMD will pause for a long time and then the download will happen very quickly... this appears to be because the video accelerator uses multiple connections to buffer as much content as possible so when the download starts, whoosh! It's done.

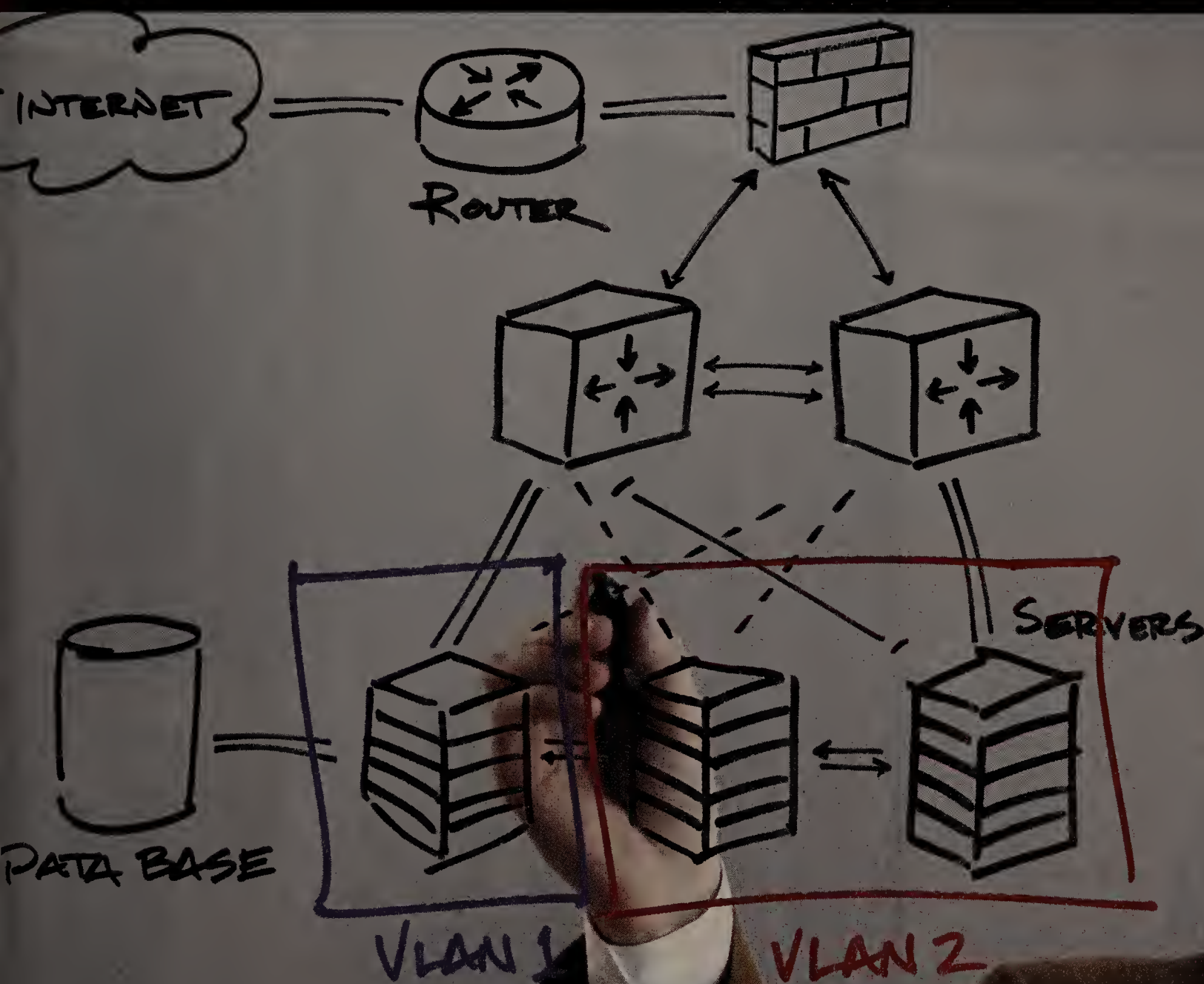
This is a very cool tool and so far in my rigorous testing YTMD has worked perfectly and the price is right. Alas, because it only handles YouTube content I can only give YouTube Music Downloader a score of 4 out of 5. Even so, it's recommended.

Gibbs is content in Ventura, Calif. Your satisfaction to gearhead@gibbs.com.

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The game-changing trends in the data center

—consolidation, virtualization, private clouds and converged storage/data networks — are forcing us to rethink the classic three-tier network topology.

THE ISSUE STARTS NOW

THE ISSUE STARTS NOW

~ BY BETH SCHULTZ ~

A

ll of a sudden, data center networking has gone from ho-hum to hot. The status quo — that hierarchical, three-tier network that has dominated the data center since the late 1990s — is being threatened, as enterprises move toward a virtualized, service-oriented, scaled-out, converged infrastructure.

The question facing enterprise IT architects and planners today is whether to stick with three tiers or to flatten out the network in order to improve performance and ultimately save money.

ndc

THE NEW DATA CENTER

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Is it time
for data center
networks to
shed a tier?

Juniper lays out flat net roadmap

The ultimate goal of Juniper's 3-2-1 approach is a single tier.

Cisco's big, fat geek wedding

FabricPath technology merges L2 and L3 to create 'big, fat Layer 2 domains.'

Brocade weaves an open fabric

Storage experts envision converged flat network based on open standards.

HP has all the pieces

But still has integration work to do.

ONLINE ONLY

"Ultimate guide to flat networks" slideshow.

tinyurl.com/25cnwx4

From the vendor perspective, companies such as Brocade, HP and Juniper Networks are pushing hard for the flat network. (See tinyurl.com/336abjq.) After all, if enterprises decide to go flat, they will need to buy new data center switches and that opens up an opportunity to displace Cisco, which for years has been all but synonymous with the data center network.

"Even companies with Cisco Catalyst switches have to re-qualify their data centers and, to go into flat network mode, they'll have to look at brand-new equipment. This is a huge opportunity for others to come and take the data center network away from Cisco" says Andre Kindness, senior analyst for enterprise networking at Forrester Research.

Cisco, of course, has next-generation plans of its own, built around its Nexus switches. And going head-to-head against industry powerhouse Cisco might also backfire against some of the more vulnerable network vendors.

Kindness says the survivability of some of these vendors could even be at stake. As servers, storage and the network converge, if these companies don't get themselves into the data center network, the rest of their businesses could be affected, he adds.

From the IT side, the allure of the flat network is being able to deploy products purpose-built for automation, convergence and virtualization. The promise is a much

simplified, fabric-based architecture from which enterprises will enjoy dramatic performance improvements as well as streamlined operational chores and expenses.

"The data center network hasn't been this exciting in probably 10 years," Kindness says. And enterprise network planners are sitting up and taking notice.

"This is a brand-new game, with the latest and greatest new technology and everybody has their specialties. The data center network definitely warrants a fresh look. We can't rely on old assumptions anymore," says John Turner, director of networks and systems at Brandeis University, in Waltham, Mass.

"Clearly all the switch vendors are racing to keep up with what's happening in the data center — and nobody has it quite right just yet, Turner says. "Some of these products are literally being released to customers with the paint still wet on them."

Fun, but no games

Jim Metzler, vice president of IT consulting firm Ashton, Metzler & Associates, says industry trade show Interop is a barometer of how the buzz around flat architectures has put the excitement back into networking.

In 2008, Metzler organized a session entitled, "Is There Anything Left to Say about the Local Area Network." The answer: Not

a whole lot.

This spring, Metzler moderated a session he called, "Why Networking Must Fundamentally Change." "I had 212 people in the audience and vendors lined up angry that they couldn't get on the panel. Why? — because networking is fun again," he says.

Perhaps so, but flattening the network is no mere amusement, experts warn.

"Truth is, if we look at data center networking trends from the demand side, meaning how the structure and mission of data centers are changing, then there's definitely a logic to rethinking how we look at data center networks," says Tom Nolle, president of CIMI, a technology assessment firm.

But network executives would be wrong in thinking a flat network is always best for the new data center, he adds.

"What really matters is what's happening in the data center, such as an increase in inter-processor communications, and how that affects the behavior of traffic and requirements placed on the network," Nolle says. "If you decide to flatten your network without looking at the entire chain, then you run the risk of either investing prematurely or in the wrong thing," Nolle says.

Many enterprises, caught up in the marketing furor around re-architecting, will end up undertaking and then aborting flat network

GLOSSARY

THREE-TIER NETWORK ARCHITECTURE: Consists of an access layer, aggregation

layer and core switch layer. **TWO-TIER NETWORK ARCHITECTURE:** Consists of an access

layer and core switch layer, eliminating the aggregation layer. **SPANNING TREE PROTOCOL:**

Created by Radia Perlman in 1985, STP set the basic rules for how switch traffic behaves on a network. Now, 25 years later, its limitations have led to efforts within the IETF to replace it. **TRANSPARENT**

INTERCONNECTION OF LOTS OF LINKS: TRILL, being developed by an IETF working group that includes

Perlman, is designed to enable shortest path multihop routing for large-scale converged data centers. **FABRICPATH:**

Cisco's 'pre-standard superset' of TRILL that's supposed to be compatible with TRILL, but also extends its capabilities.

projects over the years, Nolle says he fears.

"As we start to promote the notion of flattening the data center network, we're taking what should be a project-based decision and pulling it out of that context," he explains. "If a project is expected to cause performance issues, and you're considering flattening the network to solve those problems, than that's a reasonable decision. But the notion of going out and flattening the network just because it's the cool thing to do is like buying a car because you think it'll make you socially successful."

Flattening the network will require a major investment in new equipment. Network executives must be able to tell a good financial story about how flattening the network will increase revenues or reduce costs outside of the data center. That will be hard for the average enterprise to do, Nolle says.

"The benefit case won't prove out ... and flat network projects will be aborted. Hopefully this will happen early enough in the cycle that relatively little will have been procured," he adds.

Price and performance rule

To flatten or not needs to come down to a price/performance evaluation.

"At end of the day, I don't care if the data center network is two or three or however many tiers. We've got to get our arms around the cost," Metzler says.

"You have to remember why we went to three tiers in the first place," says Robin Layland, head of Layland Consulting, which specializes in network architecture and strategy for enterprise customers. "We couldn't get the density we needed to with two tiers. It was just too expensive, so we went to three tiers. That was the cheapest way to get the performance we needed. There was no inherent goodness in a three-tier architecture," he adds.

Data centers are changing, but the decision points for network managers remain the same. "If a two-tier network can give you great performance at a better price than a three-tier design, it wins because theoretically it should have lower latency and even

TO FLATTEN or NOT TO FLATTEN?

Five tips from the experts

1. If you're considering flattening your data center network with convergence an ultimate end goal, be sure to allot for plenty of time for organizational change, says **JIM METZLER**, vice president of IT consulting firm Ashton, Metzler & Associates. The networking, server and storage teams will need to interact seamlessly, but "organizational change takes much, much, much longer than anybody ever gives it credit for," he says. "There's a phrase I've been borrowing recently, which is this: 'Culture eats strategy for breakfast.'"

2. Think logically, says **OMAR SULTAN**, marketing manager, Data Center Solutions, at Cisco. You can flatten your network logically, with one switch managing all others in a fabric, but still have the same number of physical tiers, he says. Enterprise network planners need to remember a one-to-one relationship between the physical and logical doesn't always equate, he adds.

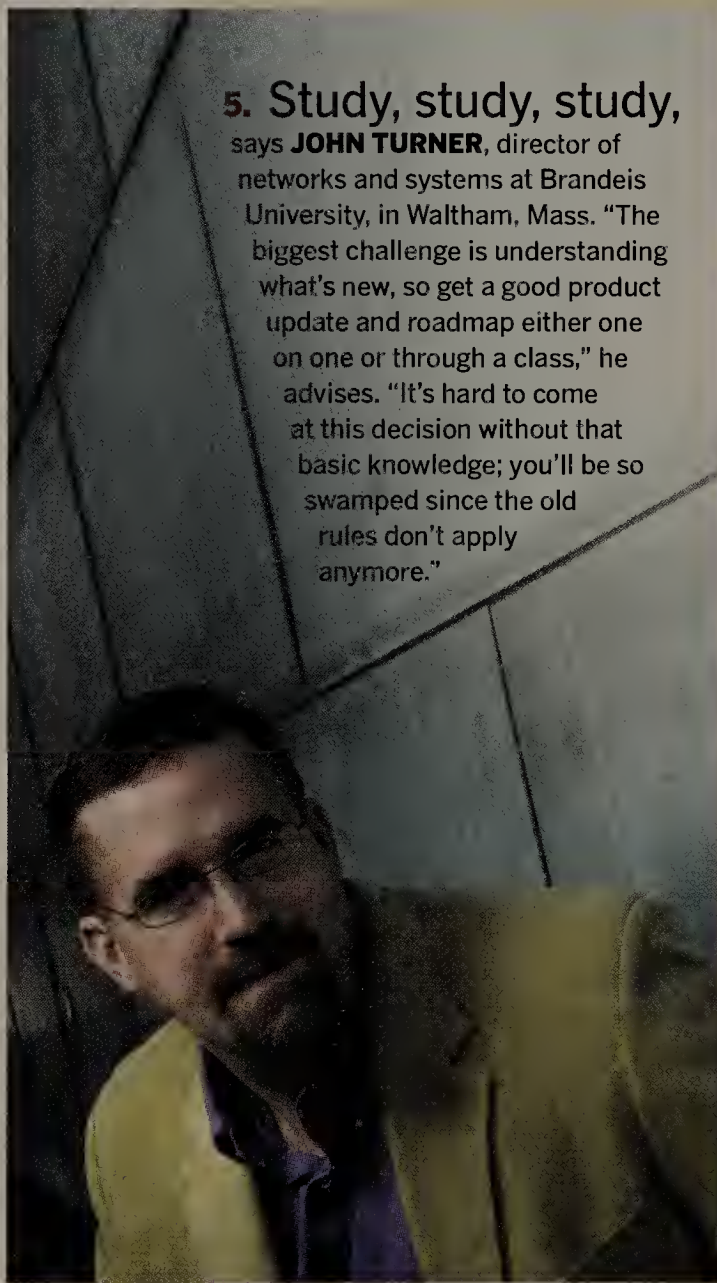
3. Study your application traffic carefully before determining whether flattening your data center network makes sense, says **TOM NOLLE**, president of CIMI, a technology assessment firm. If your data center network isn't supporting much inter-processor communications — i.e., componentized application or virtualization traffic moving between servers — or storage data, then flattening the network doesn't make much sense, he says.

4. Evaluate price/performance, says **ROBIN LAYLAND**, head of Layland Consulting. If price/performance doesn't come down by dropping from three tiers to two or fewer, then why bother, he asks.

— Beth Schultz

5. Study, study, study,

says **JOHN TURNER**, director of networks and systems at Brandeis University, in Waltham, Mass. "The biggest challenge is understanding what's new, so get a good product update and roadmap either one on one or through a class," he advises. "It's hard to come at this decision without that basic knowledge; you'll be so swamped since the old rules don't apply anymore."



better reliability too," Layland says.

The decision doesn't need hurrying, but a careful study of options and setting of expectations, Kindness says.

"This isn't going to happen for two to five years out and even then not as one big change-over at once," he says. "This is going to be an evolution, and no one should expect their vendors — server, storage or networking — to enable this to happen automatically."

"None of these vendors is going to be able to produce the whole thing end to end perfectly

in the beginning," Layland says.

So in the short run, they'll differentiate themselves on how they handle the new networking requirements brought on by server virtualization. "It would be nice to use all possible connections at least from the servers to the first switch or top of rack, because that's where the problem first shows up and where we have a lot to gain. Plus, the first storage integrations will take place at those top-of-rack switches, too — it won't mix all across the network at first," he adds.

"We'll have to see who can pull this off and how well they handle the execution," Layland says. "This is where you see the most opportunity for proprietary magic." ■

Schultz is a longtime IT writer and editor. She can be reached at bschultz5824@gmail.com.



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JUNIPER LAYS OUT FLAT NET ROADMAP

3-2-1 approach has one-tier network as the ultimate goal

~ BY BETH SCHULTZ ~

F

rom its position in the switching trenches, Juniper Networks has planned not one, but two ways to flatten legacy three-tier data center networks.

Juniper calls its approach the 3-2-1 data center network architecture, promoting the idea that enterprises can cut one tier out of their data center networks today and, ultimately, another.

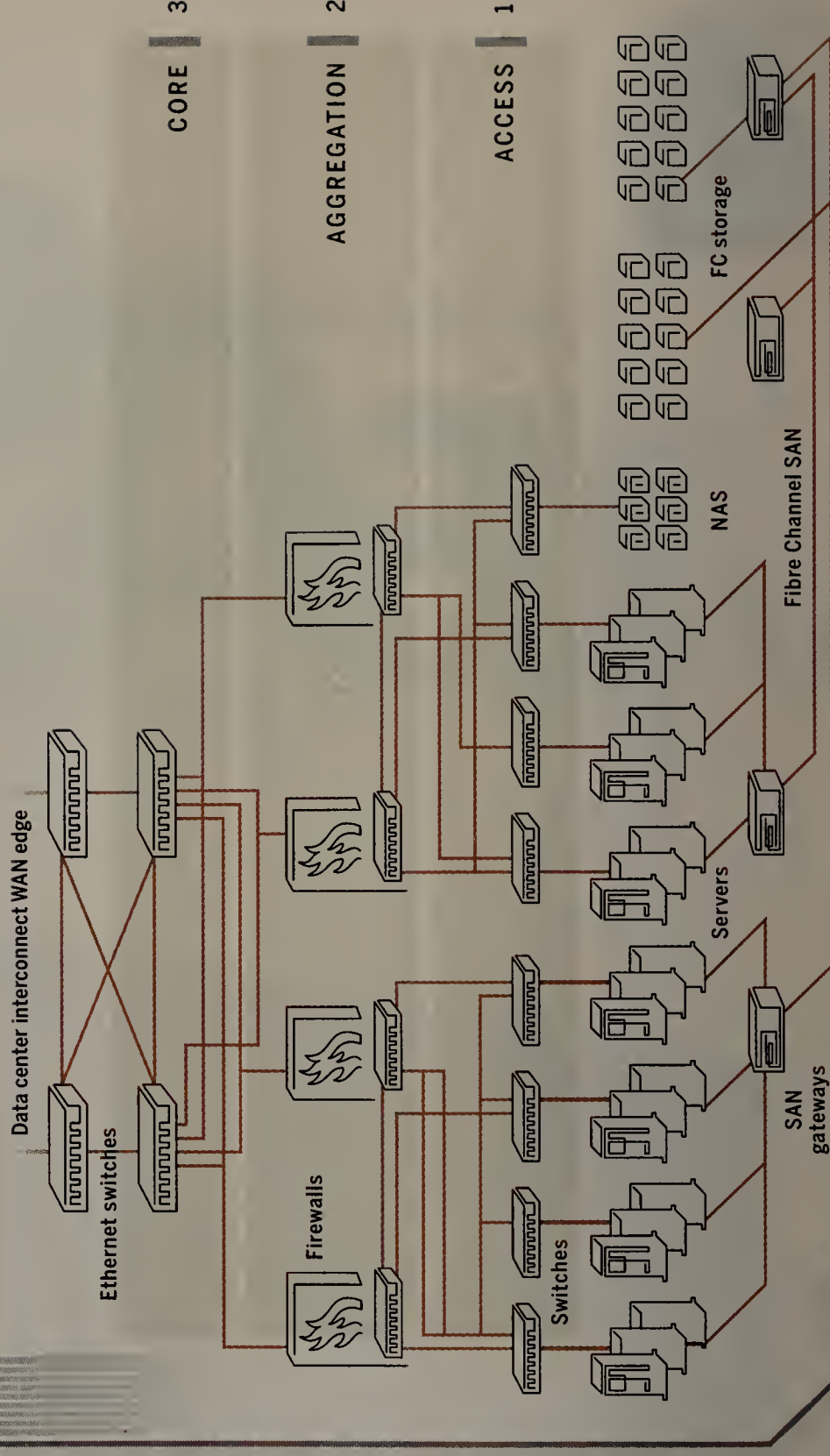
The result will be the flattest of all flat networks — a single layer operating as one giant switch. Juniper shared that ultimate vision, called Project Stratus, almost two years ago, but products aren't expected until 2011.

A two-tier fabric

In the meantime, enterprise network planners who see value in a flatter architecture can take advantage of a two-tier fabric using Juniper's Virtual Chassis technology.

3 TIER NETWORK

Large-scale, three-tier networks are complex to build and difficult to manage.



Applied at the access layer, Virtual Chassis technology allows up to 10 EX 4200 top-of-rack switches to operate and be managed as a single logical switch comprising hundreds — 480 in the case of the EX 4200 — of Gigabit Ethernet ports.

Juniper also will have Virtual Chassis technology available on the EX 4500, a 48-port 10G Ethernet switch that will be available later this year or early next year, says Calvin Chai, a director of enterprise marketing at Juniper.

Enterprises can mix and match EX 4200 and 4500s, which also will support Converged Enhanced Ethernet and Fibre Channel over Ethernet (FCoE) for storage convergence, in the same Virtual Chassis fabric.

"You still have your physical devices, but instead of using the traditional chassis-based model with a single chassis sitting in a rack and slotting in modules for ports, you can have these one-rack unit servers distributed throughout the data center. You can extend the Virtual Chassis fabric across floors, buildings or in the same rack using fiber connections," Chai says, noting a distance limitation of 50 kilometers.

"And, you don't have to have 10 different uplinks from each of those switches. You just need one uplink because it behaves as one logical switch, so you're saving on port density and can collapse the core and aggregation layers — you simplify the network as you scale it up," he adds.

"Juniper does have this nice, interesting twist with how it's pulling off this two-tier architecture by making it look like one machine," says Robin Layland, head of Layland Consulting, which specializes in network architecture and strategy for enterprise customers.

A single network hop

Further reducing complexity and bolstering performance would come with even more streamlining of the data center network architecture, Chai says. Juniper hasn't disclosed Stratus project details, but the goal is to collapse to a single layer that will provide connectivity from any point to any other point in a data center with one processing hop, he says.

And don't be fooled by the "3-2-1" name, Chai says. Enterprises do not need to flatten the network progressively. An enterprise running a large three-tier data center network could go straight from there into a Stratus fabric, he says.

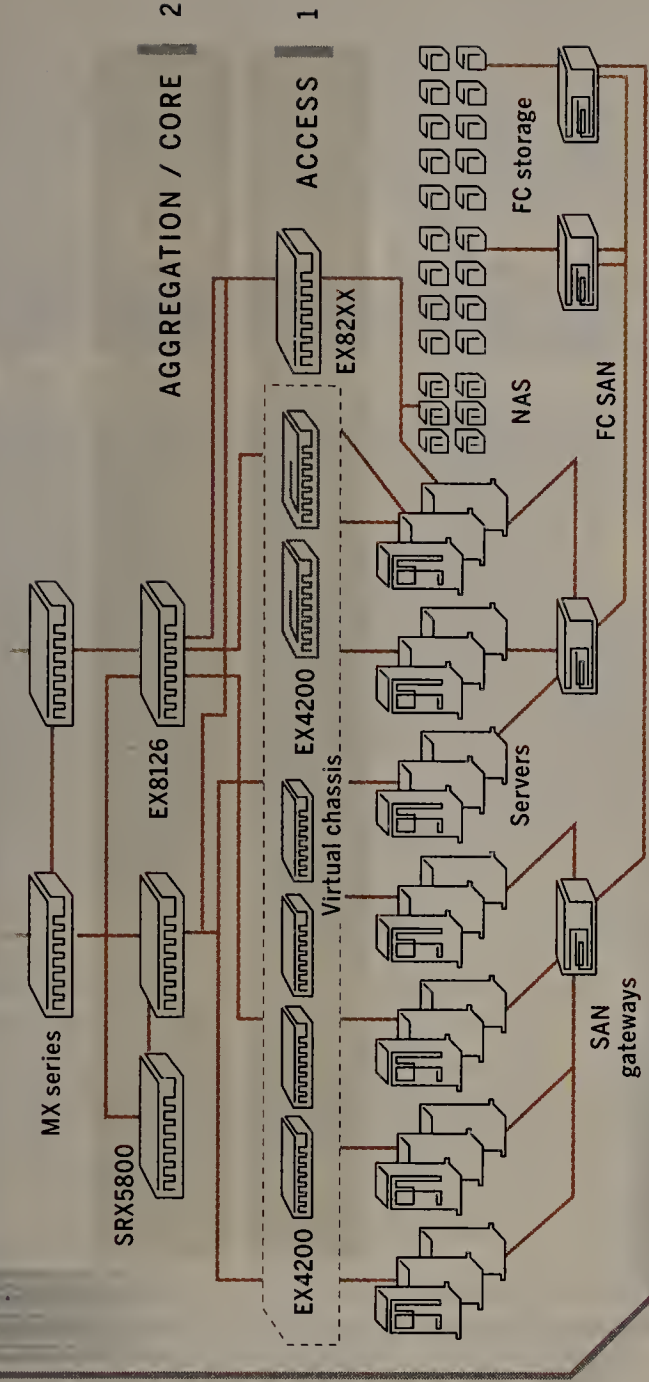
"I don't dare use the word 'FDDI,' but it does sound like Juniper is planning to interconnect all these machines together and, in effect, form a super bus loop over the data center. Data would travel around the bus until the right machine pulls it off," Layland says, referring to an obsolete token-based networking technology. "We definitely don't want to say 'FDDI,' but you can ask all the same sorts of questions and bring up the same issues using new terms if we're essentially talking about a ring architecture."

"One tier, two tier — are we talking 10-minute abs or seven-minute abs? It's really all up to the flexibility of the customer," says John Turner, director of networks and systems at Brandeis University, in Waltham, Mass., which is currently evaluating how best to handle a data center network refresh coming in 2011.

Juniper has made Brandeis' short list of choices, as has Cisco. But Turner says he's made no final decision on how best to flatten the network in support of increased virtualization. Storage convergence is on his mind, too, but not a burning issue at this point.

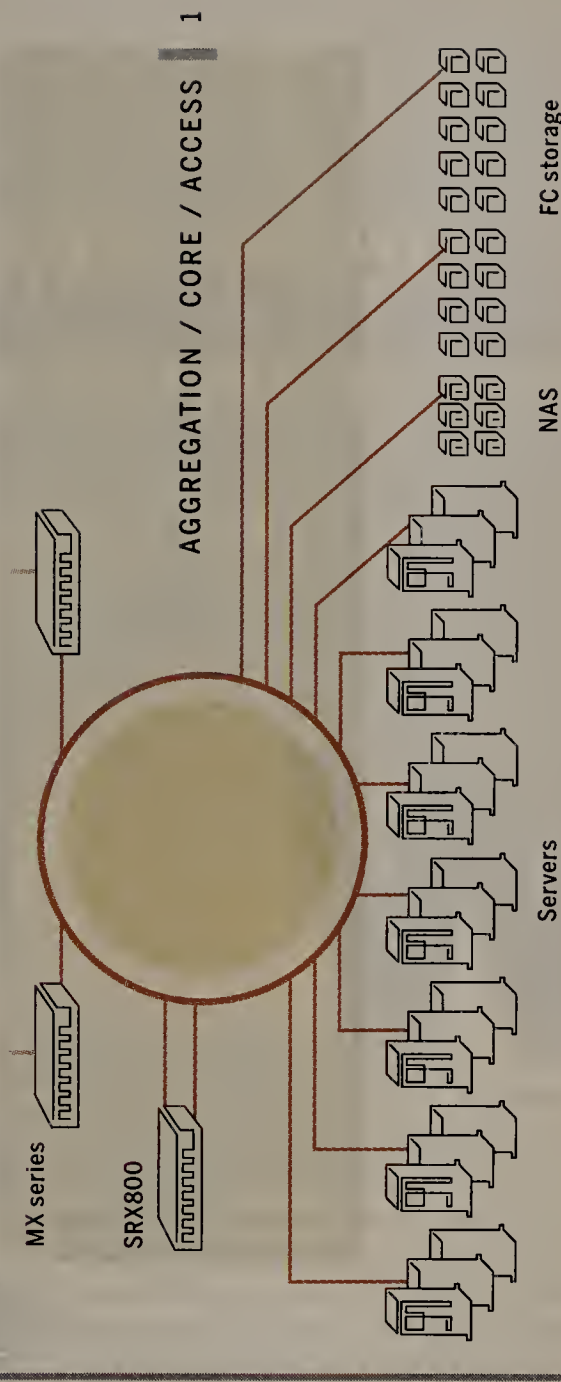
2 TIER NETWORK

Using switches and Virtual Chassis Technology available today, simplified, high-performance scalable two-tier networks can be built.



1 TIER NETWORK

In the one-tier design, a single layer will act as one giant switch. Products to support this vision are expected next year.



CISCO'S BIG, FAT GEEK WEDDING

FabricPath merges L2 and L3 to create vast, scalable domains

~ BY BETH SCHULTZ ~

W

hen talk turns to flat networks, Cisco has as much of a story to tell as the other guys, if not more so.

"In our conversations with customers, we talk about the importance of decoupling physical tiers from logical tiers in terms of design, traffic and engineering efficiencies," says Omar Sultan, a marketing manager with Cisco's Data Center Solutions (DCS) group.

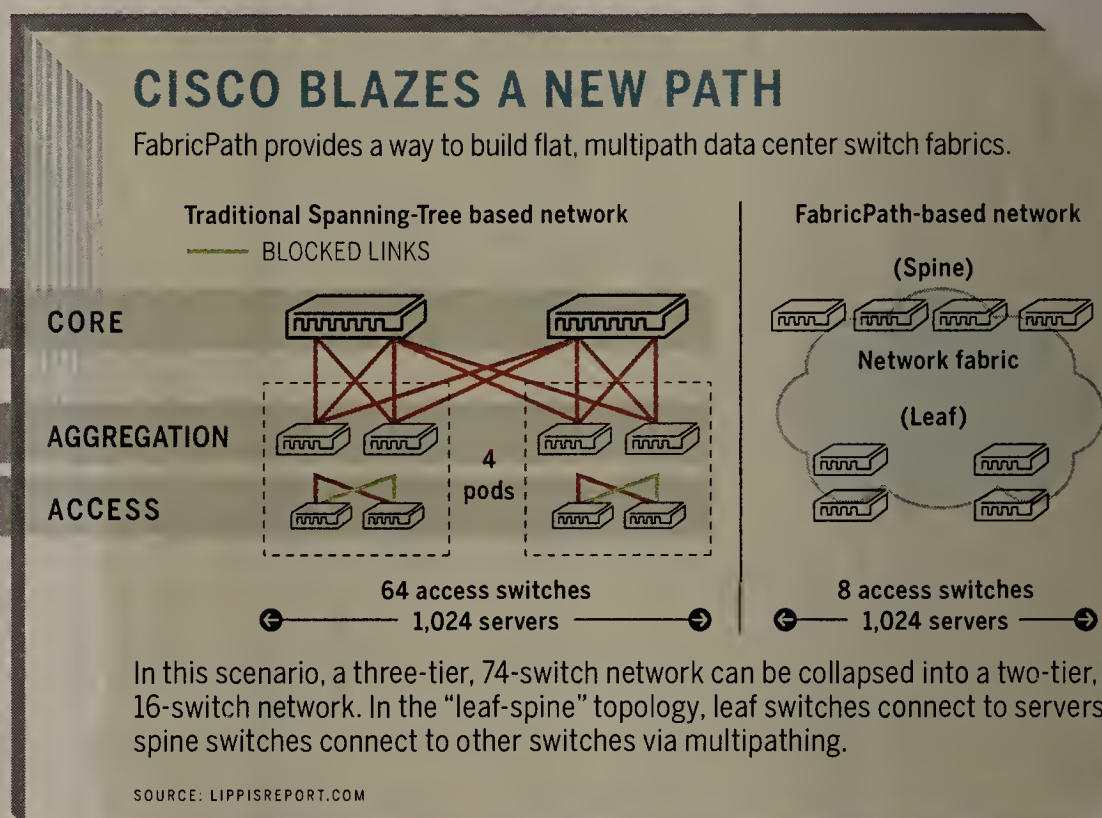
"When you've got things like live migration of virtual machines and scale-out enterprise application architectures going on in your data center, flattening the network makes sense," Sultan says. "Supporting those types of traffic flows start to require a big, fat, Layer 2 domain, with lots of bandwidth and deterministic latency between the servers."

And when you're talking "big, fat, Layer 2 domains," you've got to diverge from a tried-and-true network technology — namely Spanning Tree Protocol (STP). Cisco has that covered in the NX-OS operating system software for its Nexus switches, with technologies such as virtual PortChannel (vPC), FabricPath and Overlay Transport Virtualization (OTV), Sultan says.

A NX-OS trio

VPC, which allows the spanning of port channels across two switches, was Cisco's early attempt to address the limitations of STP. More significant differentiators are the newer FabricPath, due this quarter, and OTV, available now.

FabricPath, an early implementation of the Transparent Interconnection of Lots of Links (TRILL) standard under development within the IETF, provides a way to scale data center fabrics by merging Layer 2 switching



and Layer 3 routing. With FabricPath comes the elimination of STP and reduced latency as traffic moves over multiple active links

"We consider this a key enabling technology for allowing enterprises to build very large, scalable networks. FabricPath literally will let them run thousands and thousands of 10G servers in a single, large, flexible Layer 2 domain," says Nikhil Kelshikar, also a DCS marketing manager at Cisco.

OTV, meantime, lets enterprises interconnect Layer 2 networks, whether those networks are in the same data center or at different locations. This is essentially a Nexus-only tunneling technology, allowing passage for Layer 2 Ethernet frames through a Layer 3 infrastructure. "You're effectively creating a virtual private cloud," Sultan says.

This is what John Turner, director of networks and systems at Brandeis University, in Waltham, Mass., says he's looking for. In fact, he says, it's one of two top criteria he has for selecting his next data center switches.

"The vendor has to meet our business objective, which is to connect multiple data centers together and be able to create a Layer 2 network over a long-distance path and complete the migration of virtual machines with available bandwidth and over distance," he says.

Cisco's guidance for enterprises is to take advantage of a flattened network opportunistically. "They should deploy a flatter network where it makes sense and leverage existing

infrastructure where that makes sense — and the nice thing is they can migrate in a granular fashion from a three-tier architecture to a flattened, two-tier or smaller architecture as they have business drivers," Sultan says.

This, of course, presumes use of the Nexus switches. Customers who have IOS-based Catalyst switches do not have the new networking technology options available with the Nexus line.

Still, even if you're talking about changing out switch lines, Cisco does come with one advantage for many data center network managers — familiarity, Turner says. And, with its year-old Unified Computing System (UCS), which integrates blade servers with storage access, virtualization and switching, Cisco can tell a good integration and management story, he says.

"What Nexus potentially gives us down the road are easier upgrade, management and integration paths, plus it will integrate with our Fibre Channel storage when we need to do that. Nexus is the story of complete integration. But it also could be about single point of failure, so we've got to consider that, too," he says.

Still Cisco's ability to tell the story not only from the networking side but also from the server and storage aisles is giving it considerable market influence, says Tom Nolle, president of CIMI, a technology assessment firm. ■

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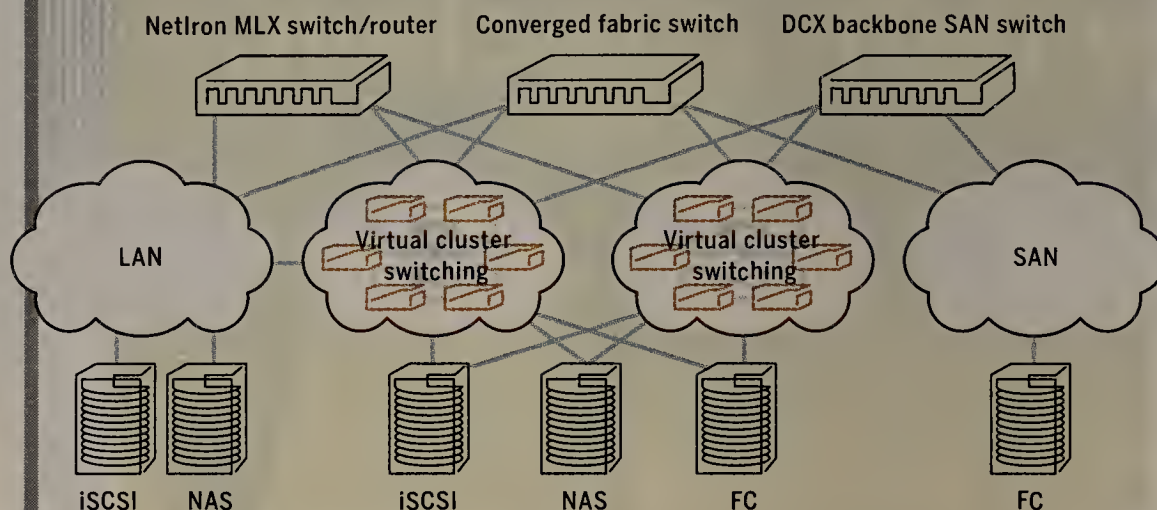


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INSIDE A 'BROCADE ONE' DATA CENTER

Brocade's flat network strategy centers on its new Virtual Cluster Switching technology, which provides support for lossless Ethernet switching and multihop storage networking.



BROCADE WEAVES AN OPEN FABRIC

Storage experts envision converged flat network

~ BY BETH SCHULTZ ~

F

ibre Channel storage vendor Brocade has long coveted a piece of the next-generation data center network. The company made that clear with its 2008 acquisition of Ethernet switch vendor Foundry Networks.

And in June, Brocade unveiled its Brocade One converged data center architecture strategy and product plans.

"Ideally, you should be able to encapsulate an application in a virtual machine and pick up network, storage, security and other

components and assemble those into a virtual data center. That data center infrastructure is tuned to the applications, and when the applications aren't needed any longer, the pieces of that virtual data center return to the pool," says Dave Stevens, Brocade CTO.

"Making virtual machines work in that environment, locally and over distance, and making the infrastructure configurable and able to be allocated via software is exactly where we're headed," he says.

Flattening the network infrastructure will make mobility of VMs much easier than it is today, Stevens says.

With this architecture, Brocade introduces a core fabric technology it calls Virtual Cluster Switching (VCS). With VCS, enterprise network managers will be able to build lossless, Layer 2 data center fabrics to support the virtualized server infrastructure, Stevens says.

But they won't need to rely on the outdated and limiting Spanning Tree, which permits only a single active path between any two network nodes. Instead, Brocade has adapted some of its storage networking know-how to the Ethernet world, and relies on emerging work from the standards bodies.

Ports in a VCS switch cluster will support the IEEE's Data Center Bridging standards for lossless Ethernet switching and multihop

Fibre Channel over Ethernet (FCoE) networking. In addition, Brocade also will use the IETF's emerging Transparent Interconnection of Lots of Links (TRILL) standard for transporting data across converged fabrics. TRILL includes the ability to route over the shortest path between two points.

"With VCS, you can wire in a mesh, a ring, a flat tree — whatever topology you want to wire in and every link is active. It supports native-mode, equal QoS multipathing through the Ethernet fabric ... with auto-discovery of active links and automatic rerouting if a switch is lost," Steven says.

"Effectively, what you end up with is a very large data center cloud that grows proportionally as you add switches," Stevens adds, noting that a VCS cluster can support 1,000 10G Ethernet ports and 10,000 VMs. In addition, the cluster is manageable as a single logical switch, and VCS clusters can be connected for environments comprising more than 10,000 VMs.

"Consider VCS a revolutionary way to build access- and aggregation-layer networks that dramatically simplify operations, improve productivity and make management easier," he says.

Brocade will ship the first VCS switches and its new management console, Brocade Network Advisor, this year, Stevens says.

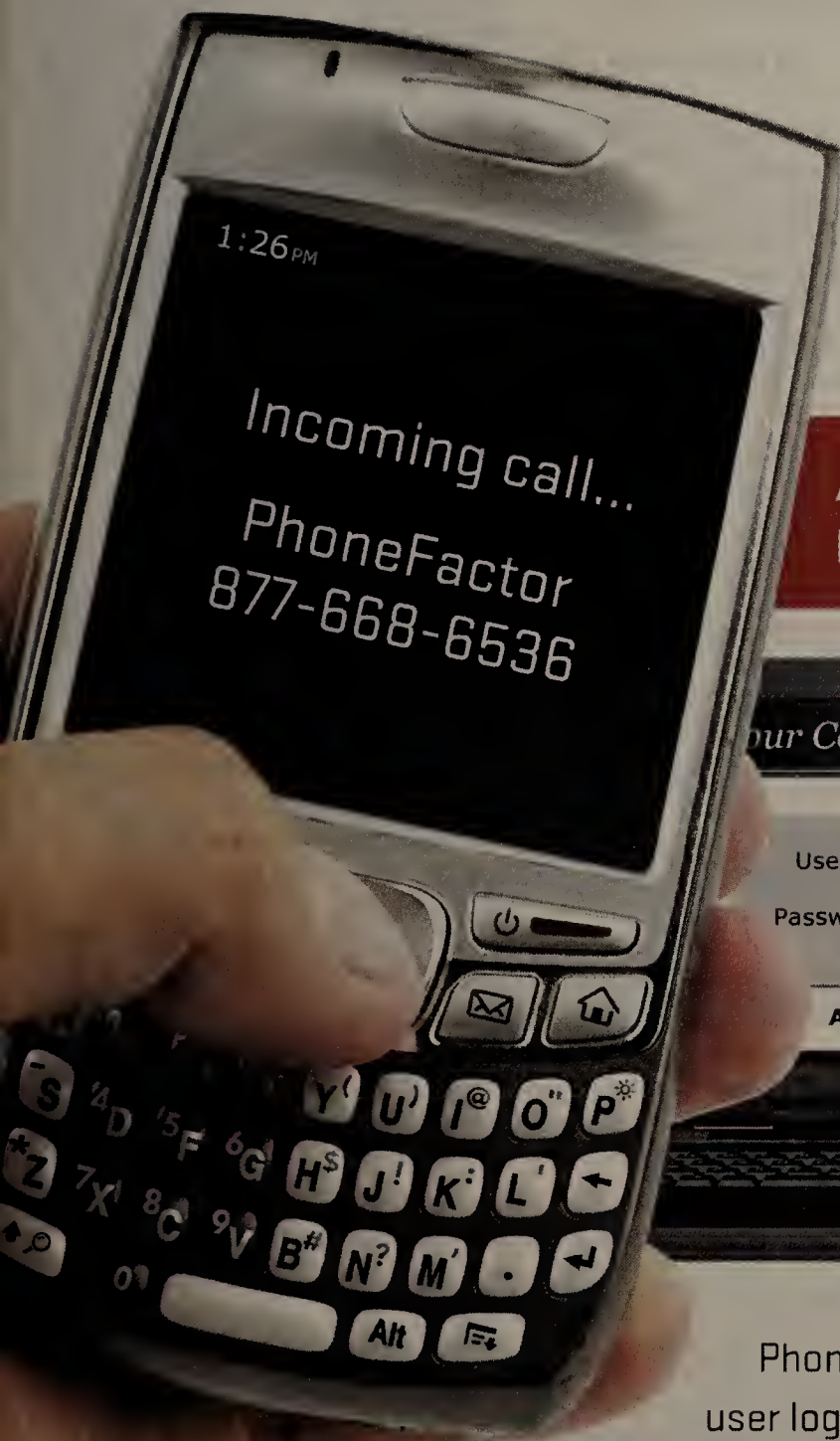
Brocade Network Advisor, a data center management tool, acts as both an element manager for data center components as well as a translation layer between the Brocade fabric and whatever orchestration and management tools an enterprise might already be using, he says.

It's all part of Brocade's goal of investment protection, Stevens says. "We know ripping out an old network and putting in an entirely new one isn't an option for our or anybody else's customers," he says.

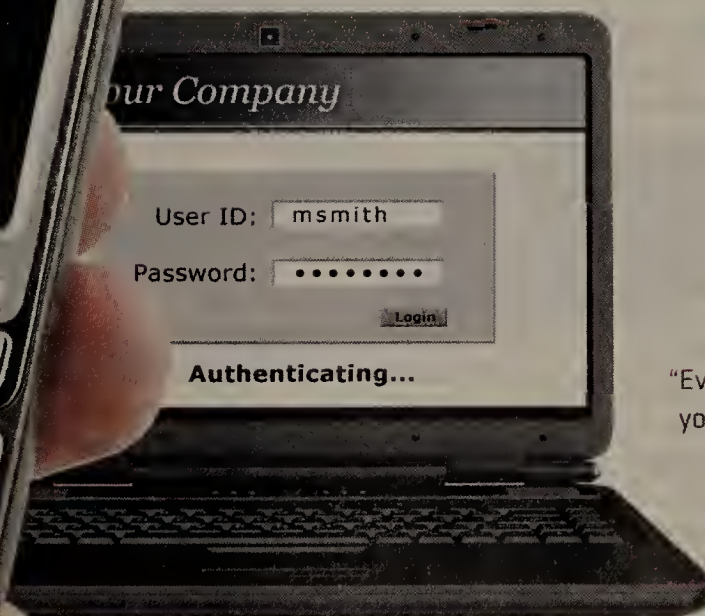
Denovo, which uses Brocade SAN switches, "is definitely watching what's going on with new data center network technology," says Jeff Wilson, service delivery director at the cloud infrastructure provider in Niwot, Colo. The ability to reduce complexity by simplifying cabling and management of the storage and Ethernet infrastructures is a motivating factor, he adds.

Andre Kindness, senior analyst for enterprise networking at Forrester Research, gives Brocade kudos for the relative openness of its unified data center scheme. ■

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HP HAS ALL THE PIECES FROM SILICON TO SERVICES

But HP still has some 3Com integration work to do before it can deliver on the flat network ~ BY BETH SCHULTZ ~

Now that HP has the 3Com H3C switch technology in-house, it's got the goods for helping enterprises flatten their data center network architectures.

But, industry watchers say, it hasn't quite been able to deliver yet.

"For HP being the juggernaut it is, it hasn't really offered a clear enough vision," says Andre Kindness, senior analyst for enterprise networking at Forrester Research. "It wants to commoditize the data center, battling against Cisco's Unified Computing System with its Virtual Connect [edge virtualization technology], for example, but it does still seem to be struggling to combine the pieces."

When it comes to the flat network, one of those pieces is the switch virtualization technology it picked up with the April acquisition of 3Com. That technology, called Intelligent Resilient Framework (IRF), is the "cornerstone of [intellectual property] we considered when we decided to acquire 3Com," says Lin Nease, director of advanced technology for HP Networking's Advanced Technology Group.

With IRF, HP can combine its newly acquired A12500 series data center core switches (formerly the 3Com H3C 12500s), for control as one big virtual switch. "Doing so lets you get many thousands of 10G-connected servers in single Layer 2 domain, cost effectively, as well as with a very high availability and fast recovery time," Nease says.

IRF boasts a maturity that isn't found elsewhere, Nease adds, since it dates back to the 3Com stacking solutions of the 1990s, but has been refined several times over the years.

HP also benefits from the earlier 3Com-Huawei Technologies joint partnership, which resulted in modern merchant silicon for use in 3Com's H3C data center switches.

"Using the latest and greatest in ASIC means low latency across the switches, which is critical when flattening the network," Nease says, citing a 50-msec recovery service-level agreement HP offers A-Series switch customers.

In today's highly virtualized data centers, "my racks may be hundreds of meters apart, but I need to be able to provision servers to be part of the same cluster and to communicate with one another with very low latency. And that's what we can do when we use IRF on our very large core switches," Nease says. "Now you don't have to care where your servers are physically located."

Also, while IRF enables connectivity from the server edge to the core, HP can preserve the Layer 3 and up network segmentation for traditional connectivity, like MPLS or VPLS, to the outside world. "This gives us complete flexibility," Nease says.

Flattening the network has value, but Layer 3 and routing are still relevant, agrees Jorge Mata, CIO for the Los Angeles Community Colleges District (LACCD).

Management, too, is a critical decision point. "Some technologies that flatten the network also consolidate management; these are very interesting to us," Mata says. "We can have a whole set of boxes, but from the management standpoint we only see one. Therefore, we

have one topology and can scale with industry standard connections as the need arrives."

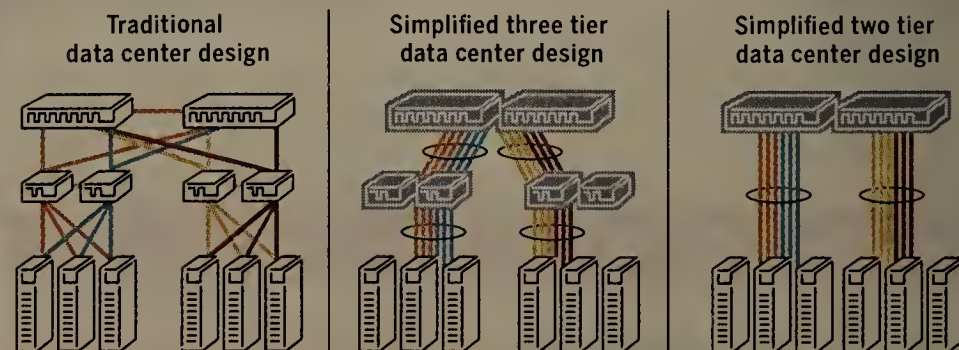
With HP, that type of management comes via the Intelligent Management Console (IMC), a multivendor management platform gained in the 3Com acquisition. "Not only can enterprises use IMC to manage their new switches, but also existing infrastructure," says Jay Mellman, director of product marketing with HP Networking.

Waiting for HP to align its flat network vision with its convergence strategy, called FlexFabric, could be worth the wait for LACCD. "I have a great team ... but anytime I can partner with an organization [like HP] that provides end-to-end services capability, it heavily reduces the risk to my organization," Mata says. "It also accelerates the deployment of services and applications to the infrastructure — which is good for the business."

Indeed, HP does bring one big unmatched asset to the table — its services organization. "We're not simply offering technology, but backing that up with support and services," Mellman says. "We're in the business of helping customers take advantage of this technology to accomplish their goals, those goals being 'how do I deliver the best applications and business services?' And, 'How do I do that flexibly?' ■

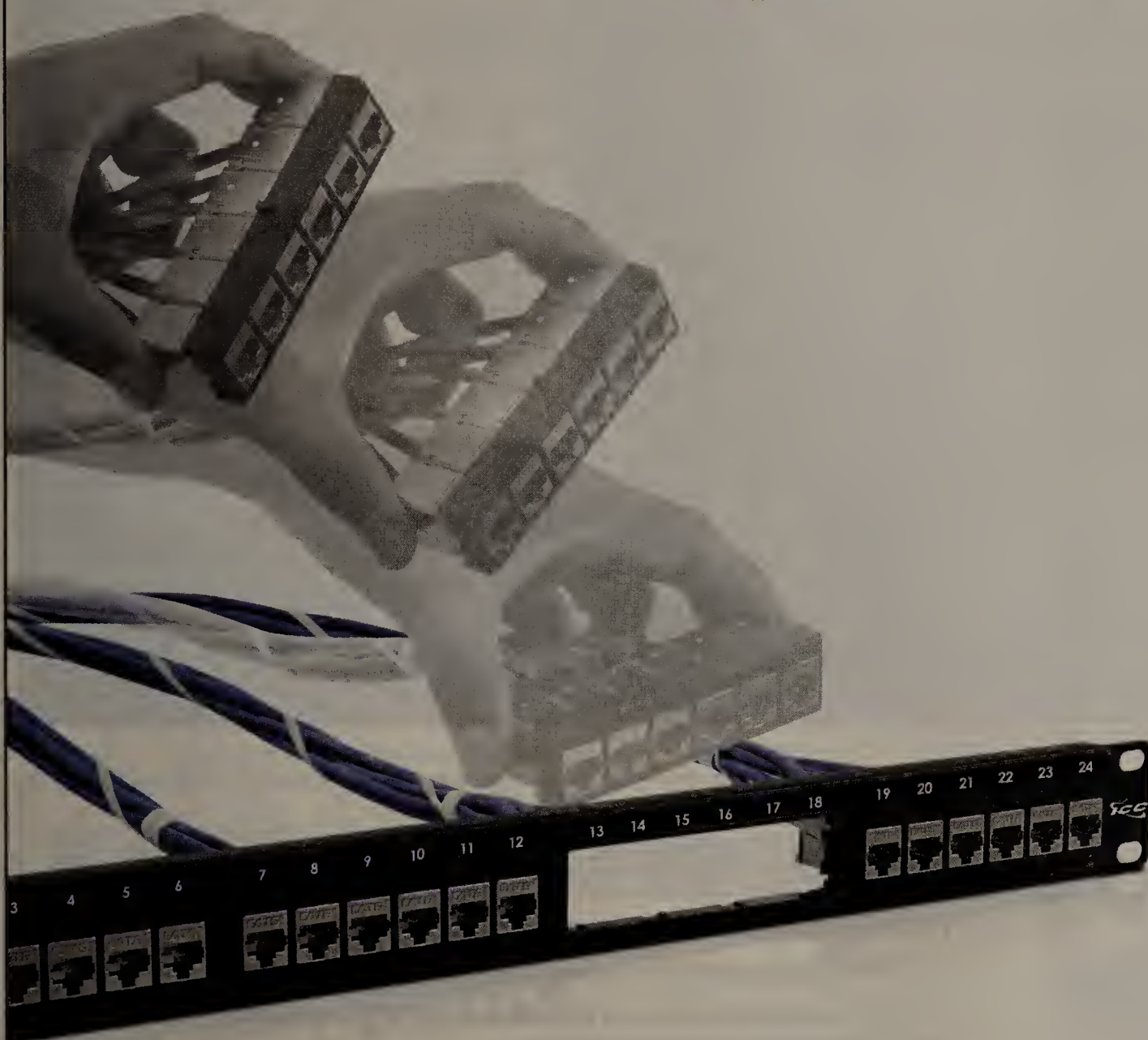
HP'S VISION OF A VIRTUAL SWITCHING FABRIC

HP replaces Spanning Tree Protocol with Intelligent Resilient Framework (IRF), which enables networks to recover in milliseconds if a link fails.



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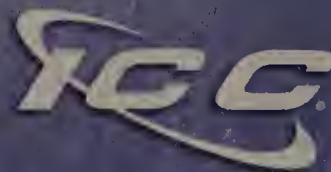


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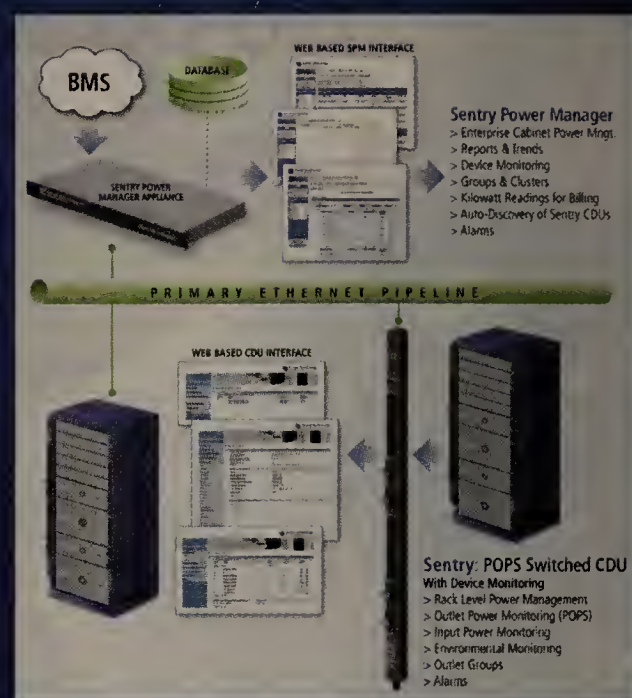
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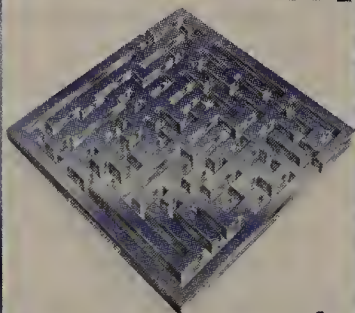


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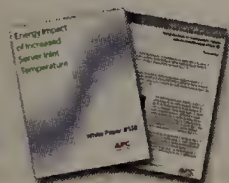
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To Send E-Mail to NWW Staff

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This numbnut ran the red light (the cop at the scene said he thought she had been texting) and, missing the other vehicle turning across her path, hit my son's Tacoma on the front passenger side wheel well. The force was so great that it bent the Tacoma's chassis about two or three degrees. Voilà! A complete write-off (so was the Bug). Luckily, no one was hurt and the numbnut admitted complete liability.

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It was the Privacy Notice that caught my attention. After explaining what private information they might collect from me, the form then enumerated the ways that they might disclose this information. These ways included "to marketing service providers and joint marketing

partners" and "with non-affiliated third parties."

Let me clarify and condense these options: What this amounts to is they can share my information with pretty much anyone they please. Anyone at all. Apparently the corporate overlords don't see anything wrong with this situation while I, au contraire, did and do. I crossed out both and printed in capitals underneath "ABSOLUTELY NOT!"

This evoked some consternation from the salespeople.

The problem I have with such overly broad permissions is not that I think they will use and abuse my private information (in fact, given how sloppily most small companies are at using customer data, I'd be surprised if they could find my private information six months from now), but rather, that I would be giving them the right to do so.

The sales guys said that no one had ever crossed out the terms in the last few months they had used the form. I found this amazing, but I guess most people either don't read what they are asked to sign or don't understand the consequences if they do.

The problem is that pretty much every commercial entity out there is trying to degrade your privacy. They ask for everything they can and the permission to use it in any way they want because it is easier than specifying and asking for what they really need.

So, the next time you go to buy anything, make sure you read any privacy notice carefully and understand just how your private information might be used, because once you let the privacy genie out of the bottle, there's no getting it back in there. ■

Don't tell anyone that Gibbs is in Ventura, Calif. Your private thoughts to backspin@gibbs.com.



Would 40% pay for mobile health services?

What's more important than healthcare?

Nevertheless, I do have a question (the one in the headline).

From the PwC press release: "Three in 10 Americans recently surveyed by PricewaterhouseCoopers said they would use their cell or smartphone to track and monitor their personal health, and 40 percent would be willing to pay for a remote monitoring device that sends health information directly to their doctor. Their interest reflects the nascent but fast-growing market for remote and mobile health and significant business opportunities for organizations using consumer technologies to support preventative, acute and chronic care."

What might "significant business opportunities" mean in dollars and cents? The PwC report pegs the annual market for remote/mobile monitoring devices and services at \$7.7 billion to \$43 billion, "based on the range consumers said they would be willing to pay."

That's quite a spread on the potential market and one might presume it is related to the caveat about willingness-to-pay thresholds. Here's an enlightening excerpt from page 18 of the 40-page report:

"While 40% of respondents would be willing to pay for a monthly mobile phone service or device that could send information to their doctor, they would prefer to pay less than \$10 for the monthly mobile phone service and less than \$75 for the device. ... Mike Weckesser, director of emerging business-health solutions at Best Buy, points out

the challenges of consumer price expectations related to mobile health technology. 'In our consumer research, although consumers identified a price threshold, they also expected the payer to reimburse them for those purchases, thereby slanting the data.'"

Translation: Most people remain unwilling to pay anything for this kind of service, and those who say they are willing to pay actually mean they're fine with paying as long as it's covered by their insurance.

Behind the Groupon phenomenon

While it's nice to know there's still plenty of "wish I'd thought of that" room on the Internet, there's something oddly unsettling about the truly astronomical success of Groupon, which is built on a not at all complicated idea. Must be this: Dang, I wish I'd thought of that.

Not yet 2 years old, Groupon offers its 13 million subscribers a daily sales pitch for a single product or service, and the pitch comes with a catch: Limited-time means exactly that; you either jump on it right away—and enough other subscribers jump on it right away, too—or the opportunity expires. The company's early performance numbers, as cited in a story last week by *Forbes*, are remarkable:

Groupon has grown faster than eBay, Amazon.com, Yahoo, AOL or Google; only YouTube reached a \$1 billion valuation faster; and, the company is already doing business in 88 U.S. cities and 23 countries.

The bad news for Groupon is that its model is easily imitated—and has been—which means there could be rougher roads ahead. But I signed up to give it a try. Will report back if I land any deals. ■

Have you? The address is buzz@nww.com.

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